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SEVENTEEN CANDIDATES FOR THE CUP

All in Readiness for Automobiling's Great International Event of the Year on Long Island

GARDEN CITY, LONG ISLAND, October 4.—Arthur Duray, the Circuit des Ardennes 1906 winner, looms up as a commanding figure in the third international struggle for the Vanderbilt Cup. Possibly lightning does not strike in the same place on three occasions, and possibly the fact that the 1904 and 1905 Vanderbilt winners were equally successful in the Ardennes contest of their respective years does not give Duray any advantage over the others in the forthcoming struggle of Saturday morning.

WILL DURAY, 1906 CIRCUIT DES ARDENNES WINNER, REPEAT THE DOUBLE VICTORIES OF HEATH AND HEMERY?

ALBERT CLEMENT AND THE CLEMENT-BAYARD CANDIDATE FOR THE CUP RACE.

Undeniably, however, there is an inclination to reason that the French expert, flushed with his recent victory, will drive with a determination such as is always to be found in a confident man. Duray is experienced, and his De Dietrich car is second to none in the list of the seventeen that will start.

But it is the most difficult matter in the world to pick the winner of a prolonged automobile contest wherein so many things can happen and disarrange the best-laid plans, in the preparation of which months have been consumed and thousands of dollars invested. With three Fiats entered, one piloted by the brilliant Lancia, another driven by Nazzaro, whose daring is tinged by common-sense caution, and Weilschott, an unknown quantity, it would appear that this make of car had slightly the better of it in the percentage of chances. Then when one has debated the proven abilities of Heath, the skill of young Clement, the experience of Wagner, reckoned with such names as Jenatzy, Shepard, Cagno and Fabry, reserving for the last the promising Tracy and the qualified Le Blon, one hesitates to express himself in certain voice as to the successful contender for the cup. Christie declines to be left out, and does not doubt his right to be classed among the leading possibilities in the battle of the motors.

WAGNER, THE DARRACQ SELECTION IN PLACE OF HEMERY.

Keene is down and out, a cracked cylinder having placed his Mercedes in the repair shop and with no extra cylinder available for substitution. Luttgen in practice drove the Mercedes with which he has been entrusted in such manner as to raise protest from some of the other drivers and incidentally to have himself placed among the decidedly long shots of the race. Therefore Jenatzy, the hero of the Irish Gordon Bennett, is the only candidate from Germany that appears to have a look-in, and the car which he drives is owned by Robert Graves, an American.

If Italy wins the cup there will be a Vanderbilt race in that country, and undoubtedly the German Automobile Club will hold a race for the cup if one of its two representatives should unexpectedly evolve in front. Since the Automobile Club of France did not officially enter the five French cars, the success of the French colors undoubtedly would mean that the cup next year will have its annual struggle on Long Island.

Chairman Jefferson De Mont Thompson has demonstrated his capacity as a successor for the energetic Morrell, and the widespread growth of automobiling has made it possible to plan and carry out an event that makes last year's race look like an earlier, though highly creditable affair, just the same. If it were possible to employ soldiery to guard the course, the American race in its conduct would rank equally as finished as the great races of Europe. As it is, the independent American citizen insists upon invading the road which he has permitted the legislators by him elected to set aside for these flying automobiles, thereby endangering his own life and the safety of those aboard the motor-driven craft.

Thousands of touring cars have encircled the Nassau County

course, the road surface of which has thus been subjected to an extraordinary amount of wear and tear and added to the difficulties of the Cup Commission to keep it in repair for the great contest. The course is not all that could be desired, though Albert Clement expressed it very tersely when he remarked that the many turns were "annoying, but not dangerous." It would be better if there were more straightaways, but the permit was for Nassau County roads, and the Commission had to work with what it had and not with what it might have wanted to have. It is expected that the fastest round of the Elimination Trial, 29:29 3-5 by Tracy, will be improved upon considerably, and a speed of about 60 miles an hour maintained for the ten circuits of the 29.71-miles course.

THE SEVENTEEN CARS THAT WILL START.

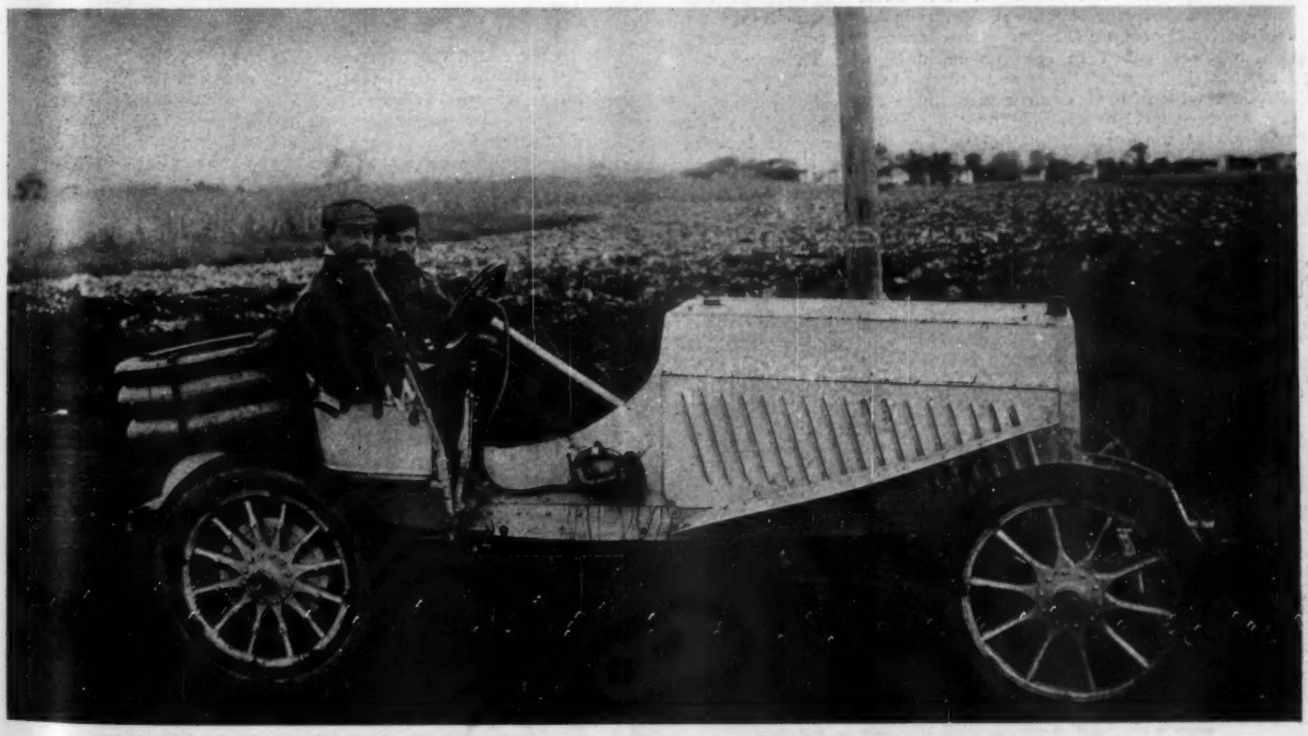
No.	Car	H. P.	Driver	[Entrant]	Nation
1	Thomas	115	Le Blon	E. R. Thomas	United States
2	Panhard	120	Heath	Panhard-Levassor	France
3	Mercedes	120	Jenatzy	Robert Graves	Germany
4	Fiat	120	Lancia	F. I. A. T	Italy
5	Frayer-Miller	110	Lawwell	W. J. Miller	United States
6	Hotchkiss	130	Shepard	Hotchkiss Co.	France
7	Mercedes	120	Luttgen	George McK. Brown	Germany
8	Fiat	120	Nazarro	F. I. A. T	Italy
9	Locomobile	90	Tracy	S. T. Davis, Jr.	United States
10	Darracq	100	Wagner	A. Darracq	France
12	Itala	120	Cagno	Itala Co	Italy
14	Haynes	50	Harding	John Haynes	United States
15	Clement-Bayard	100	Clement	Clement-Bayard	France
16	Fiat	120	Weillschott	F. I. A. T	Italy
17	Christie	50	Christie	Walter Christie	United States
18	De Dietrich	120	Duray	A. de Turckheim	France
	Itala	120	Fabry	Itala Co	Italy

CONCERNING THOSE WHO WILL DRIVE.

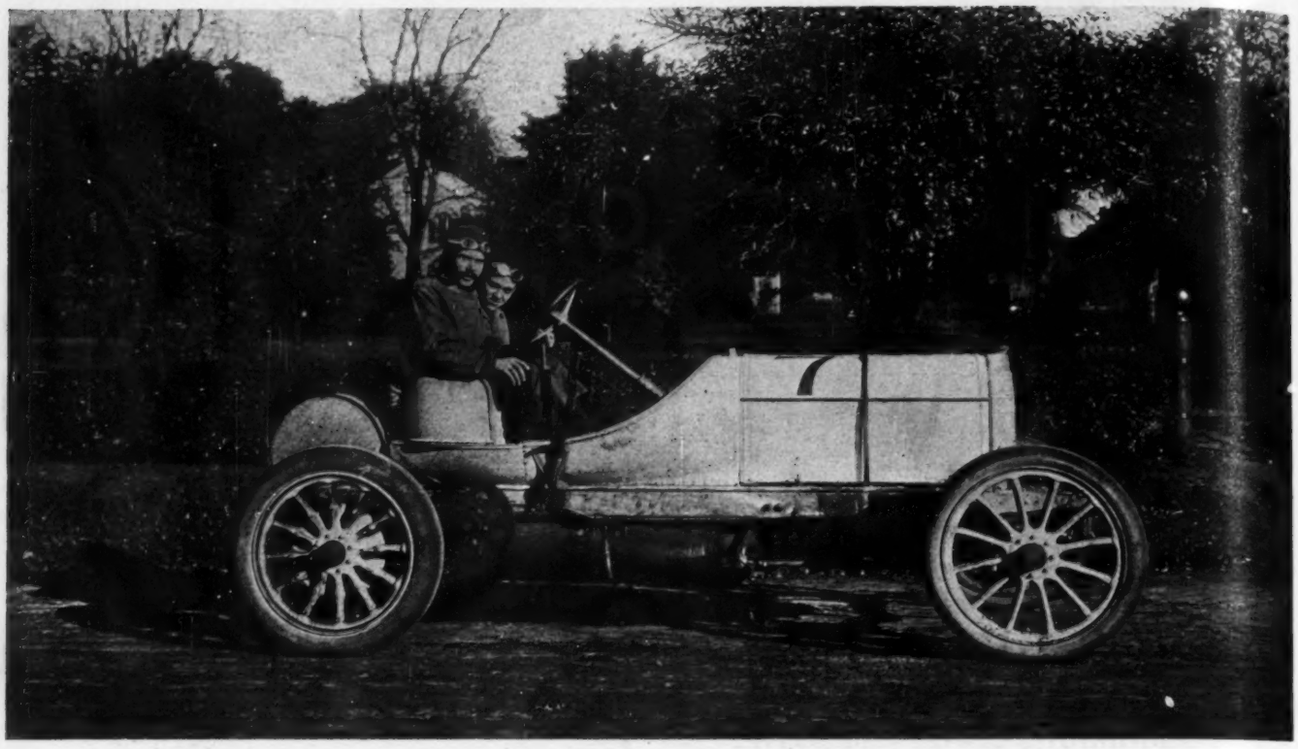
ARTHUR DURAY (De Dietrich).—Was born in Brussels, February 9, 1882. Was a bicycle rider for five years previous to 1898, when he started as an automobile driver in the Spa Criterium, driving the Gobron's Torpille. 1901: Was in Paris-Vienne. Did not finish. In the Belgium-Ardennes, where he finished eighth, and at the Chateau Thierry's hill climb, where he made the second best time in the voiturette category. 1902: Was in Paris-Madrid and Ardennes for Gobron. 1903: Was engaged by Darracq. Established the 100 kilometers record on the Belgium-Ardennes Circuit. Was second in Mont Ventaux and fourth at Brescia. 1905: Was sixth in Auvergne Gordon Bennett Cup; eighth in the Ardennes, and second in the Florio race in Italy. 1906: Seventh in La Sarthe Grand Prix, and first in the Belgium Ardennes, with an average of 106 kilometers an hour.

WHO WOULD RECOGNIZE CLEMENT AND HIS MECHANIC?

FELIX NAZZARO (Fiat).—Born in Turin, December 4, 1881. In 1900 was in Brescia as Lancia's mechanic. Same year drove a car himself (Panhard) in the Padoue Coupe Nationale. 1901: Won Piombino Livorno, 90 kilometers, on a 50-horsepower Panhard. 1902: Established a road record on the Padoue road on a 75-horsepower Panhard, 10 kilometers, in 5 minutes 12 seconds. 1903: Won the Florence hill climb contest, covering the flying kilometer in 21 seconds. 1904: Engaged by the Fiat factory. Was second at Brescia, and second at Mont Cenis hill climb. 1905: Was second in Auvergne Gordon Bennett Cup. First in Mont Cenis. Sixth in Brescia, and sixth in Vanderbilt Cup. 1906: Was second in La Sarthe Grand Prix, and fourth in Copa di Oro. A very calm and



GEORGE HEATH, THE 1904 WINNER, AND THE PANHARD WHICH HE IS DRIVING THIS YEAR.



LUTTGEN AT THE WHEEL OF THE 120-HORSEPOWER MERCEDES NOW OWNED BY GEORGE McKESSON BROWN.

cold-blooded driver. They say in Italy that he is more scientific and possibly faster than great Lancia.

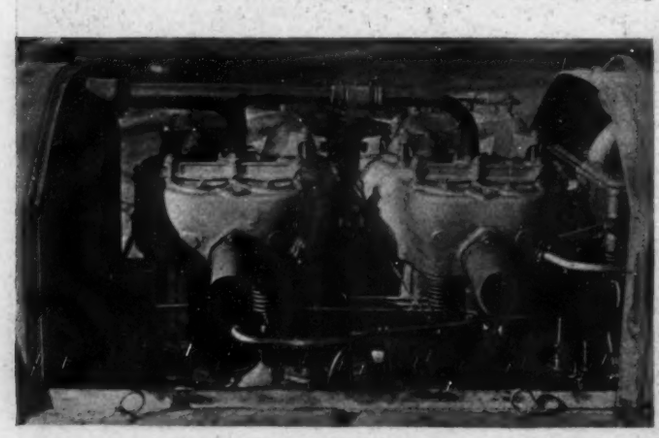
LANCIA (Fiat).—Started in the automobile game as a chauffeur to the Queen Helena of Italy in 1899-1900. In 1900 he ran his first race, driving a Fiat at the Brescia race, 500 kilometers, where he arrived first. Was first again in Padoue in 1901. First again in Mont Cenis, 22-kilometer hill climb contest. Was classed first, covering the distance in 30 minutes. In 1903 was in Paris-Madrid, but stopped at Versailles, 30 kilometers after the start. Was in the Ardennes-Belgium Circuit the same year, where he finished ninth. In 1904 ran the Taunus Gordon Bennett Cup, where he finished eighth. Was first again in Brescia, same year. Third in Mont Ventoux (France) hill climb contest. First in Florence (Italy) competition. In 1905 ran a splendid race in Gordon Bennett Cup held on the Auvergne Circuit. After having led for the first eight laps, was compelled to stop on account of a leaking radiator. Was third in Brescia (Italy) and fourth in America at the Vanderbilt Cup, where he also ran a memorable race. Same year again in Havana—experienced some hard luck and did not finish. In 1906 was one of the competitors in the La Sarthe Grand Prix race. Had numerous misfortunes; did not place himself. Recognized as one of the most adroit, fast, and daring drivers in the world. A favorite in this year's Vanderbilt Cup. Was born in Fonbello, Province of Novarro, August 24, 1881. Won the great Copra di Oro (gold cup) in Italy, 3,000 kilometers competition.

ELLIOTT F. SHEPARD (Hotchkiss).—Was born on Long Island, United States, October, 1876. Was in Paris in 1894, where he started in automobile construction. Had bought the patents of a two-cylinder motor from Dore Brothers, and exhibited several of his cars and chassis at the very first automobile exhibition of the world, held in the Tuilleries Gardens in Paris that same year. Has been interested in the automobile industry ever since in America and abroad. Showed his splendid qualities as a daring and adroit driver this year in France in the La Sarthe Grand Prix, where he drove one of the 135-horsepower Hotchkiss cars. He was the only driver who never completed a lap before the race.

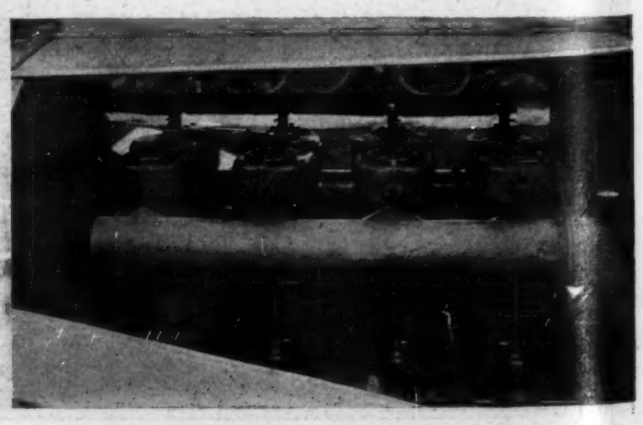
WILLIAM C. LUTTGEN (Mercedes).—Was born in Stuttgart. Is 29 years old. 1903: Was in Paris-Madrid with Foxhall Keene as his mechanic. Also in Ireland. Was driving himself a Mercedes in 1904 in the Vanderbilt Cup race, where he covered eight laps.

ALBERT CLEMENT (Clément-Bayard).—Born in Paris, April 23, 1885. Is actually a soldier in the Ninth Regiment of Artillery, garrisoned at Vincennes, near Paris. Is the son of "Papa" Clement, the oldest cycle and automobile manufacturer of the old world. Knew how to drive a motor car possibly before he knew how to write his name. Albert Clément is the spoiled child of the racing game, and a very refined, educated, and gentlemanlike child is he. Drove his first big car in 1903 in the Mont Ventaux hill climb. In 1904 was in the Taunus (Germany) race for the fourth Gordon-Bennett cup, where he had numerous tire troubles and could not

(*Continued on Page 446.*)



THE EXHAUST SIDE OF THE MERCEDES ENGINE.



THE EXHAUST SIDE OF THE PANHARD ENGINE.

CONCERNING THE CARS THAT WILL CONTEST

THE most impressive fact for the layman and the expert alike, revealed in an examination of the Vanderbilt Cup cars, is their striking similarity in every essential respect. This bears out the contention of the motor wise, to the effect that the evolution of the modern mechanical road conveyance has progressed far on its way to final standardization. The American entrants supply the few exceptions, though the air-cooling representation is the exponent of an idea that appeared in almost the same identical form in Daimler's first automobile engine, and to which there is much evidence that the foreign and domestic manufacturers will recur ultimately, despite the present prevalence of the water-cooling system.

In their plans for winning the race, the warring designers seem all to have agreed that the weight limit of 1,000 kilos (2,204 pounds) is none too high for a racing monster, and most of them crowd this weight limit closely. Another evidence of agreement is found in the fact that every car in the race will have four vertical cylinders, placed in front. With few exceptions the bores are slightly greater than the strokes, giving practically "square" cylinders when the compression space is taken into account.

Practice in respect to double-chain drive versus shaft drive seems about equally divided, there being nine examples of the former against eight of the latter, with one car—the Christie—provided with a direct spur-gear arrangement. One of the engines is cooled by air jackets, three of them have attached water jackets and all of the rest have water jackets cast integrally of the cylinder metal. Two of the engines have steel cylinders, contrary to the otherwise invariable use of cast iron, which is favored even by the makers of the two steel-cylindered racing machines for their stock touring cars.

Jump-spark ignition seems a loser in some degree, if its status be judged by these eighteen foremost examples of automobile building, there being rather more applications of the make-and-break than of the high-tension principle.

Six of the cars—the three Mercedes and the three Fiats—utilize the peculiarly excellent Lindsay spiral-spring clutches. Of the other cars, though several of them have cone clutches, these seem definitely inferior to the disk clutches that are fitted to the machines of their competitors.

Not a single example of thermosyphon water circulation appears, from which it may be reasonably concluded that this is no longer regarded as effective as the centrifugal pump for high-powered machines, however well it may serve touring purposes.

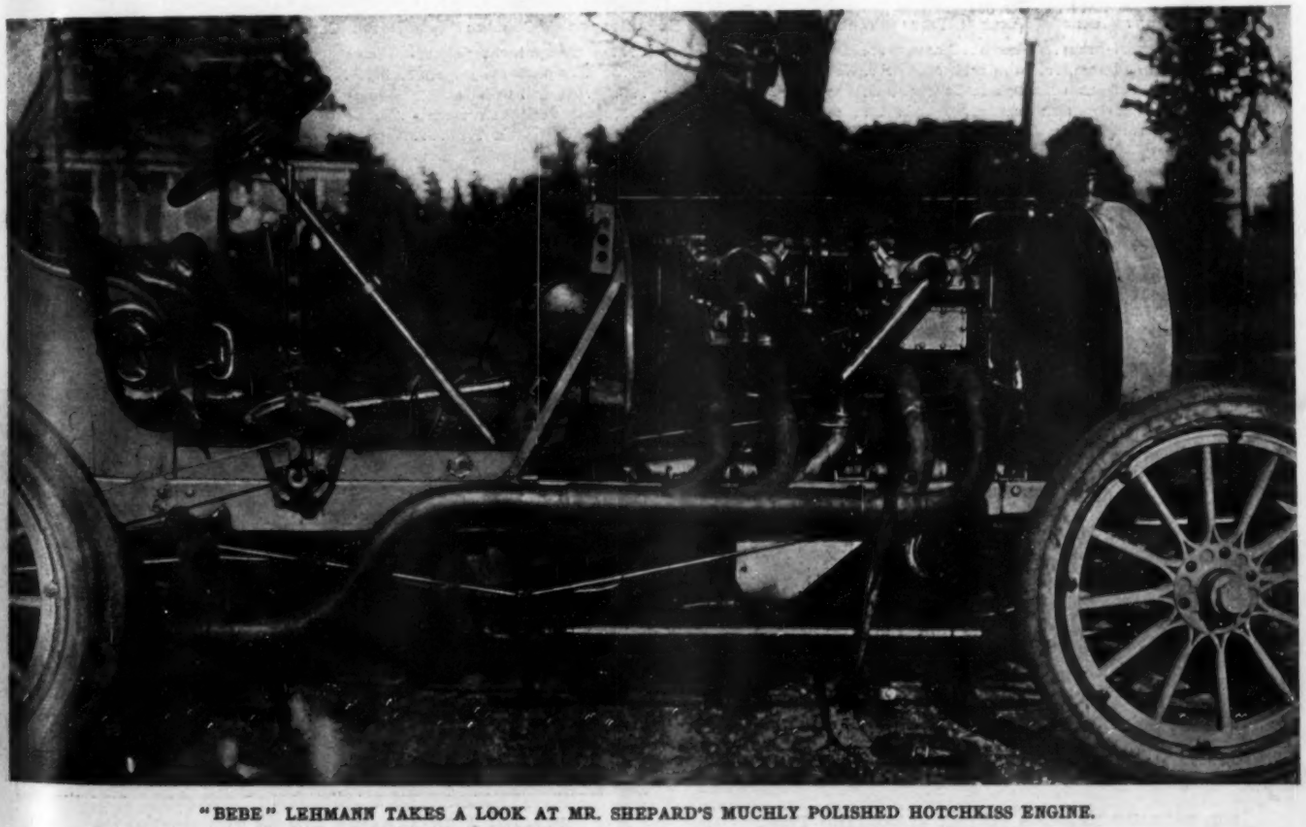
The I-beam alloy-steel construction, except for tubular or rotating axles, has its competitors outnumbered, though a few of the cars show forged axles of other cross section than the I-beam. The usual pressed steel frame, of channel section, appears on every car, the only novelty in this respect being the American Pope-Toledo car, which may at the last moment be substituted for the Haynes, if arrangements and protests at present under consideration are carried through. This frame is of pressed steel, in the form of an inverted U.

It is interesting to note that most of the foreign cars have rather narrower treads than are favored by the designers of this country. Presumably this is for the purpose of saving weight, and past performances seem to indicate that it does not seriously increase the dangers of overturning on sharp curves.

Detachable rims have made a distinct hit, because of a merit that is perfectly obvious. It is likely that before the day of the race they will be applied to several of the cars now listed without them, thus improving their chances for places.

Tire diameters with the foreigners are slightly greater than on the domestic cars, averaging 36 inches against an average of 34. The smallest tires are on the Christie, which is fitted with 30x4 Diamonds. This is the lowest hung car in the contest.

With regard to the question of final drive there is evidently considerable difference of opinion, for five of the cars are



"BEBE" LEHMANN TAKES A LOOK AT MR. SHEPARD'S MUCHLY POLISHED HOTCHKISS ENGINE.

JENATZY OF DAREDEVIL FAME, WHO HAS TRAVELED UNDER AN UNLUCKY STAR SINCE THE IRISH GORDON BENNETT.

fitted with side chains and seven with propeller shaft drive. The Christie car, with its direct gear drive, is neutral in this.

Wheelbases vary all the way from 98 inches to 116 inches, and treads from 50 to 57 inches. Wire wheels, notwithstanding their lightness, are found on one car only, the Darracq.

Only in one instance is the conventional sliding gear transmission abandoned; the Frayer-Miller car uses a pin-gear system, and moreover has the boldness to pin its faith to two speeds only, all the other cars having either three or four speeds.

MECHANICAL DETAILS OF THE THIRTEEN MAKES THAT WILL COMPETE.

Name	Weight	Front Axle	Rear Axle	Tires	Wheels	H.P.	Cyl'ders	Bore	Stroke	Cooling	Drive	Clutch	Ignition	Wheel base	Tread
Thomas	2215	I-beam	I-beam	Diamond	Wood	115	In pairs	6¼	5½	Integral waterjackets	Chains	Pin	Jump-spark	114	50
Panhard	2219	Forged	Tubular	Michelin	Wood	130	Separately	7½	7	Copper waterjackets	Shaft	Disk	Jump-spark	112	55
Mercedes (3)	2219	I-beam	I-beam	Continental	Wood	125	In pairs	7	6	Integral waterjackets	Chains	Spiral	Make-and-break	115	53½
Fiat (3)	2217	I-beam	I-beam	Michelin	Wood	116	In pairs	7½	6½	Integral waterjackets	Chains	Spiral	Make-and-break	112	53
Frayer-Miller	2203	Tubular	Tubular	Diamond	Wood	110	Separately	7½	6	Air jackets	Shaft	None	Jump-spark	98	56½
Hotchkiss	2211	Forged	Tubular	Michelin	Wood	125	In pairs	7½	6½	Integral waterjackets	Shaft	Cone	Jump-spark	104	57
Locomobile	2202	I-beam	I-beam	Diamond	Wood	90	In pairs	7½	6	Integral waterjackets	Chains	Cone	Make-and-break	110	54
Darracq	2213	Forged	Tubular	Dunlop	Wire?	125	In pairs	7½	6	Integral waterjackets	Shaft	Cone	Jump-spark?	112	53
Itala (2)	2217	Forged	Tubular	Michelin	Wood	110	In pairs	7½	5½	Integral waterjackets	Shaft	Disk	Make-and-break	116	55
Haynes	2205	I-beam	Tubular	Diamond	Wood	50	Separately	6	5½	Integral waterjackets	Shaft	Exp.ring	Jump-spark	108	56
Clement	2213	Forged	Tubular	Dunlop	Wood	125	Separately	6½	6½	Attached waterjackets	Shaft	Disk	Make-and-break	114	53
Christie	1780	None	I-beam	Diamond	Wood	50	Separately	7	5½	Attached waterjackets	Front	Cone	Jump-spark	106	56
De Dietrich	2202	I-beam	I-beam	Michelin	Wood	130	In pairs	7½	6½	Integral waterjackets	Chains	Cone	Make-and-break	116	55

MR. SHEPARD BELONGS TO THE ELONGATED TYPE.

PLACING A DETACHABLE RIM ON THE HOTCHKISS.

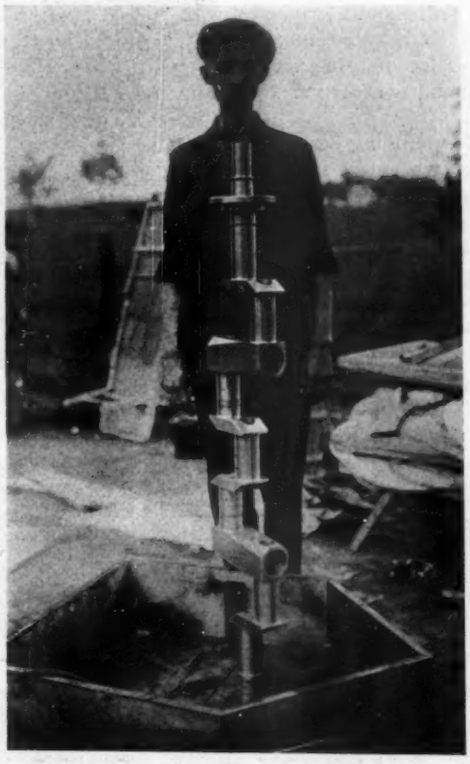
AN AUTO CAMP ON THE LONG ISLAND COURSE

By H. F. DONALDSON

IT is the dynamics of racing that draws the crowd. A ton of metal projected along the road at perhaps seventy miles an hour, and carrying two tensely set figures is a spectacle that must thrill the man who has good red blood in his veins.

And yet, there is much of the picturesque about the training quarters that are scattered along the course. The Vanderbilt race gives those who live in the Metropolitan district a chance to see how a racing machine is coaxed to do its best. At quaint little inns and modern road houses, mellowing in local color, the camps of the contestants may be discovered.

There is a suggestion of military occupation about these peaceful headquarters. Driving along some pleasant road that winds through woods and fields, one suddenly comes to an unexpected enclosure, from the interior of which breaks out a steady roar of exhausts like an automatic gun. You pull up ready for the picket's challenge, and instead comes the greeting: "Hello! What time did Christie make this morning?"



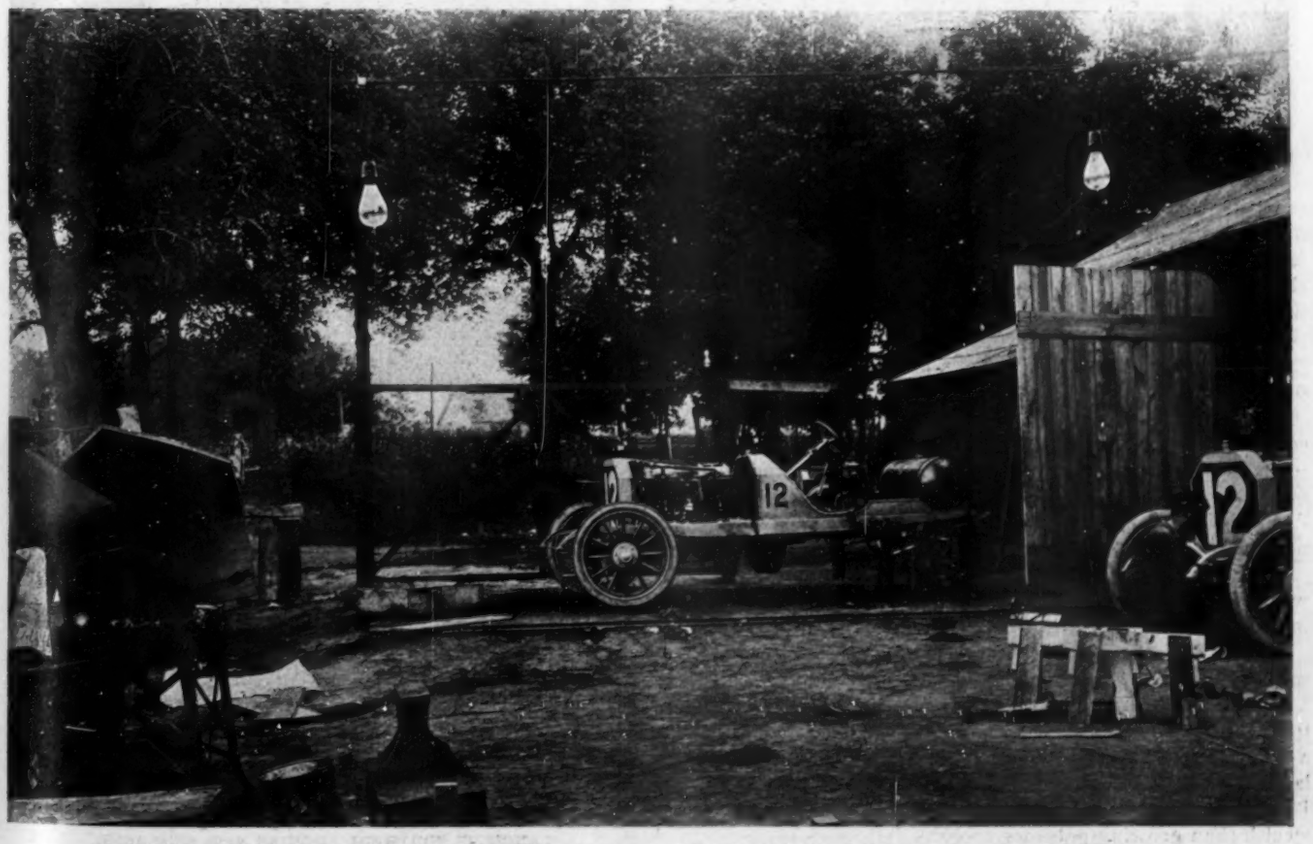
THE LOCOMOBILE'S SPARE CRANKSHAFT.

A little bit of gossip is always a safe conduct to an automobile camp.

Of course, there are camps and camps, varying in their equipment all the way from a bench and vise with a closet full of supplies to a machine shop filled with tools and a house jammed with tires and fittings.

A typical camp of the latter kind is that of the Locomobile, at the Lakeville turn. There a swinging sign attracts the eye to the old-fashioned inn, shaded by a thick grove of maples. From its build it might have dated back to Colonial days, when through one of its many doors some fleeing Tory could have easily eluded his pursuers. Whatever the reasons, there are more doors than windows—an ideal place for the fresh-air cure on a windy day.

Behind this peaked-roof inn, where ancient trees stretch their branches, and vines and other creeping things stray about the grass and graveled walks, a big wire net enclosure surrounds the camp. An old horse stable has been extended into a row of barn-like buildings with tight wood floors and wide, unpainted swinging



VIEW OF THE LOCOMOBILE CAMP ON THE VANDERBILT CUP COURSE, AT LAKEVILLE, LONG ISLAND.

doors, that house the two big racing cars and enough machine tools and spares to start a model factory.

Each racer has a separate compartment. Around the walls are all the extra parts that will hang on pegs, and trays and boxes on shelves contain screws and bolts and little fittings.

Next to the compartments for cars, the machine shop is fitted up with a screw-cutting lathe, drill press, and a grinder, all driven by an electric motor belted to a countershaft. Several parallel vises and a miscellaneous lot of tools, from a rat-tailed file to a big Stillson wrench, are carried on benches or in racks along the walls.

The last compartment of the big wooden building has been christened the garage, for here the working cars are stabled. There are five of them—stock machines of different sizes—and it is the task of a separate gang of factory hands to keep them ready for instant service. They are seldom idle, too, for there are trips to be made to the city for supplies, or to the railroad depot at Great Neck for passengers, or to some distant part of the course, where a station is to be located.

In the inclosure in front of the sheds the blacksmith's forge and anvil are always ready to work a heat or dress a tool.

It is in the early morning, after the practice spins, that the camp is really active. When Tracy drives the big machine into the yard from a speedy tryout on the course, he may order the gearbox taken down or all of the road wheels re-

A LOOK INTO THE LOCOMOBILE MACHINE SHOP.

moved. The car is run onto the platform (shown in the photograph), wooden horses are put under the axles, and in less than half an hour the gang of a dozen experts from the shop has the machine dismembered, ready for inspection. Then the work for the day is laid out by the driver and things quiet down to a routine in this al fresco shop. Poole, the clever mechanician of the team, keeps an experienced eye on the work to see that things go forward smoothly.

At the further end of the inclosure a small padlocked house contains dozens of tires—some armored for wet day driving—costly oil by the barrel, carbide by the keg, and metals and materials of a dozen different kinds, all ready for use. A long-distance 'phone supplies a ready means of filling a need if anything else is wanted.

Neither day nor night is taken into account when any work is to be done; there are 150 32-c.p. lamps wired in the inclosure, and switches in every compartment.

To win the race is a big undertaking, bigger than it seems when one watches the cars flying past on the road, and the Locomobile folk intend to win if they can. It costs money to keep a camp going when, for instance, a single meal means a dollar, and what one can see at this camp is found in similar or less degree at the other quarters. Nassau County, Long Island, has discovered that there are shorter ways to wealth than growing potatoes.

NAZZARO IS THOUGHTFUL, CALM AND COLLECTED.

DR. WEILSCHOTT IS THE STUDENT OF THE FIAT TEAM.

LANCIA IS YOUTHFUL LOOKING SANS MUSTACHE.

ALCOHOL AS A FUEL IN EXPLOSION MOTORS*—III

By THOMAS L. WHITE.

MOST of us perhaps retain some recollection of an experiment which, in the earlier days of popular science, was a classic feature of lectures on elementary chemistry, and which consisted of burning a jet of air in an atmosphere of coal gas. The truth illustrated, of course, was that, combustion being nothing but the chemical union of two substances accompanied by the evolution of heat and light, the terms "combustible" and "supporter of combustion" are interchangeable.

A similar inversion of accepted ideas in the case of internal combustion motors not only affords a new viewpoint, but leads to a truth which is not in any way new, but which, at first, when baldly stated, has something of the appearance of a paradox.

Let us, instead of speaking of burning gasoline or alcohol in a motor, speak of burning air; and let us, instead of regarding gasoline and alcohol as fuels of different calorific value, consider air to be a fuel whose calorific value differs with the medium in which it is burnt. The statement of the fuel question then takes the following form: Given a motor, in what vapor is it best to burn the air drawn in at each suction stroke, so as to get the hottest combustion? The answer, which at first sight seems absurd, is that, no matter what vapor or gas may be employed, the heat freed by the combustion in a given motor of a given volume of air is practically a constant.

Fuel Quantity and Calorific Value.

The reason of this apparent negation of experience lies in the fact that a given volume of air is only chemically capable of combining with a definite quantity of a given fuel, and that in practice if a fuel *A* has twice the calorific value of another fuel *B*, the quantity of *A* which can combine with the given volume of air is about one-half of the quantity needed in the case of *B*.

To take the instance of gasoline and alcohol, we will premise that the cylinder capacity of the motor is such that, when gasoline is the fuel employed, 1 oz. is enough to unite chemically with the whole of the air drawn in at each suction stroke. Taking gasoline as essentially Hexane $C_6 H_{14}$, and assuming that the alcohol used contains 90 per cent. of pure $C_2 H_6 O$, a simple calculation gives the corresponding amount of alcohol as 1.94 ounces. In other words, the amounts of gasoline and alcohol necessary to satisfy the chemical affinity of the oxygen of the air in the charge are 1 ounce and 1.94 ounces respectively. To get the heat actually liberated in each case we must multiply these weights each by its proper calorific coefficient, which gives

$$\frac{1 \times 19{,}000}{16} = 1{,}187.5 \text{ B. T. U.}$$

as the heat energy liberated by the gasoline, and

$$\frac{1.94 \times 10{,}000}{16} = 1{,}212.5 \text{ B. T. U.}$$

as the heat energy liberated by the alcohol.

These quantities may be regarded, for practical purposes, as identical, the difference, 25 B. T. U. (British thermal units), being so small compared with the whole heat generated as to be negligible.

It will be apparent from the foregoing figures that the admixture of various substances with alcohol to raise its calorific value is founded on a misconception, if the object be to increase the total heat supplied to the working stroke. If, say, benzol ($C_6 H_6$) is added to alcohol, any gain in the calorific value of the mixture is set off by the fact that a proportionately less amount is vaporized in the carbureter. If such an addition cheapens the fuel or if it improves the efficiency of the motor, that is, the ratio of the heat utilized to the heat liberated, it is advantageous; but no "tuning up" of a fuel will enable us to get more horsepower out of a given motor unless the substance added lessens the radiation, quickens the operation of combustion, diminishes the amount of suppressed heat, increases the possible amount of compression, or, in some way or other, chemically or physically improves the working cycle and brings it a little nearer to that of the ideal motor mentioned earlier in this article. So true is this, that in some quarters in Germany it is proposed to increase the calorific value, not of the fuel, but of the air, if one may so put it, by adding ammonium nitrate to the explosive mixture, with the result that during combustion this substance is decomposed, yielding oxygen to supplement that contained in the atmosphere.

Alcohol Enriched with Benzol.

The standpoint, however, of the automobile owner, in reference to the enriching of alcohol by the addition of benzol or similar substances does not relate principally to the question of increasing the heat capacity of his motor, for, as a rule, he has plenty of margin for all practical purposes. Nor does it relate in any large degree to a small saving in fuel cost, for, after all, a saving of a cent or two on the fuel bill does not greatly lighten the operative cost of a machine. The main consideration in his case is that he operates a motor whose normal duty is to burn gasoline and whose compression ratio limit is determined by the ignition point of a mixture of gasoline and air. If he uses alcohol as a fuel for such a motor, he must either be content to lose the thermal advantage of alcohol over gasoline, namely that it permits of practically twice the amount of compression, or he must by the insertion of a plate in the interior of the cylinder or some other device diminish the volume of his combustion chamber. If, however, he uses alcohol mixed with benzol, he is employing a fuel whose combustibility and general thermodynamic behavior approximates more nearly to gasoline, so that the rendered efficiency, as distinguished from the potential efficiency, of his motor is increased.

Until the production of alcohol and its distribution shall make possible the use of automobile motors whose prime object is to burn alcohol, these objections are insuperable, and alcohol *carbure* will probably be the form in which the new fuel will first appear on the market.

Liberated and Utilized Heat.

It has been pointed out that to liberate by combustion in a given motor a definite number of heat units, 1 unit by weight of gasoline or 1.94 units by weight of alcohol are equivalent. It is usual in practice to measure liquid fuels by volume rather than by weight, and stated in this way the ratio becomes 1.7 to 1, alcohol being heavier than gasoline, which is to say that 1.7 gallons of alcohol and 1 gallon of gasoline will liberate the same amount of energy in the combustion chamber of an explosion motor. It must not, however, be inferred that for every ten gallons of gasoline carried in the storage tank of an automobile, 17 gallons of alcohol must be substituted to cover the same mileage. To emphasize the point again, it is not the total heat *liberated*, but the total heat *utilized*, which counts, and whether the motor be one in which the compression cannot be adjusted,

*Concluded from page 406, issue of September 27, 1906.

or whether it be one in which the full degree of compressibility of air carbureted with alcohol can be attained, the advantage in the proportion of work rendered on the crank shaft lies with alcohol, so that the amount of alcohol which is equivalent to ten gallons of gasoline is not so great as the figures derived from its calorific value would imply.

It has been established experimentally that a motor which rendered 10 B. H. P. with gasoline, when run with alcohol, without any changes whatever, gave out 11.3 B. H. P. (Evidence before Committee on Payne bill.) Taking these figures as typical and well within the limits of practice, we may put the equivalent of 10 gallons of gasoline at

$$\frac{10}{11.3} \times 17.4 = 15.4$$

gallons of alcohol, or, roughly, as half as much again. The inference is that to use it *in the same motor*, to perform the same work, alcohol must be saleable at two-thirds the price of gasoline, gallon for gallon; that is, 10-cent alcohol is necessary to compete with 15-cent gasoline for ordinary standard automobile motors.

Price Comparison of Gasoline and Alcohol.

If, however, the two fuels are conceived as being burned each in a motor suited to its chemical and physical idiosyncrasies, the thermal handicap in favor of alcohol is much greater. To quote from recent trials, in which each fuel was used under the best conditions, the highest thermal brake efficiency percentage in alcohol motors was found to be 31.5, in gasoline motors, 23. The equivalent of 10 gallons of gasoline under these conditions is

$$\frac{23}{31.5} \times 17.4 = 12.7$$

gallons of alcohol, and, to compete on equal terms, the price of the new fuel will have to be a fifth less than the price of gasoline, or, putting gasoline at 15 cents a gallon, alcohol will have to be sold at 12 cents to be on the same footing so far as cost is concerned. In the light of the fact that it is now being manufactured in Cuba at 10 cents a gallon, and that the United States Agricultural Department has succeeded in obtaining it from corn cobs, at the marvelously low cost of 3 cents a gallon, it is inconceivable that prime cost should ever be a bar to its general introduction.

There are certain properties of fuels connected with their use which it is difficult to measure in money. Alcohol, for example, is a much cleaner burning substance than gasoline, and if any of its vapor escapes unburnt through the exhaust there is very little perceptible odor, and that pleasant. Mr. Fehrmann and other German authorities attach great importance to this point, which is perhaps due to the fact that the German attitude toward anything approaching a public nuisance is one of stern repression. The safe storage qualities of alcohol have already been commented upon in this article, but, as a practical instance, we may mention that the gasoline motor wagon for light transport was turned down by the British War Office for no other reason than the danger of having gasoline around in camps where men are smoking and cooking. Another advantage of alcohol is that its flame radiates much less heat than does the flame of gasoline. This simplifies the problem of cooling alcohol motors. For example, in the Poids Lourds trials in France in 1905 the radiator of one of the alcohol cars broke down, but the run was proceeded with, the chauffeur being able to get along with boiling water in the jacket, which he replenished whenever possible. The correspondent of *The Engineer* (London) who accompanied him, very justly remarked in his report that, under like circumstances, a gasoline car would have been put out of the running.

Field for Use of Alcohol.

The foregoing are all cases in point of the kind of quality to which a cash value cannot be directly assigned. So far as pleasure vehicles are concerned, it is the opinion of the writer that the safety of alcohol for transport, storage and handling, and the odorless character of its combustion, will quickly insure its general adoption, even at a slightly greater cost per B. H. P. hour and in spite of the drawback, entailed by its use, of a larger fuel reservoir. So far as commercial vehicles are concerned, the element of safety is also of importance, but it is primarily on its quality as a cheap fuel that the acceptance of alcohol in the field of industrial transport must ultimately depend. At present the indications of a low prime cost in the near future are so encouraging that the manufacturer of commercial vehicles who would turn his attention to alcohol motors will only be anticipating the inevitable, while, as a reward for his enterprise, he will secure a name and a lead of which it will be difficult for his competitors to deprive him.

For convenience, the principal numerical data quoted or established in this and the preceding installments of this article are appended.

	ALCOHOL ($\frac{90\%}{C_2H_6O}$)	GASOLINE ($\frac{C_6H_{14}}{Sp.\ Gr.\ .710}$)
Equivalent calorific values	10	19
Equivalent thermal efficiencies	1.4	1
Equivalent weights yielding equal heat	1.94	1
Equivalent volumes yielding equal heat	1.7	1
Equivalent volumes yielding same result with same motor	1.5	1
Equivalent volumes yielding same result under best respective conditions.	1.25	1

(*Concluded.*)

ALCOHOL FROM CORNCOBS.

The Department of Agriculture is developing a new industry in the production of alcohol from corncobs, which, the Department says, promises to be of much commercial value. Investigations are being made at Hoopeston, Ill., and have proved that the large quantities of corncobs which every year go to waste can be made to produce alcohol in sufficient quantities to justify the erection of a distilling plant in connection with a corn cannery.

So far the Department has succeeded by simple methods of fermentation in getting a yield of 11 gallons of alcohol from a ton of green cobs, and, by similar methods, in getting 6 gallons of alcohol from a ton of green cornstalks. A Department official says that these tests show that there are 240 pounds of fermentable substance in a ton of green field cornstalks, which will yield about half their weight in absolute alcohol. In round numbers, a ton of stalks will produce 100 pounds of alcohol or 200 pounds of proof spirits. As a gallon of alcohol weighs nearly 7 pounds, there should be 15 gallons of alcohol in a ton of stalks. The addition of the corn on the cob adds further to the possibilities of alcohol obtainable from a ton of cobs, and will have its influence in bringing the quantity to a greater figure.

The Panama canal zone offers a good opportunity for the introduction of automobiles, according to Consul General Shanklin, of Panama. The streets of Panama City have been paved in several directions, and splendidly built roadways reach to the Sabanas, where are the summer homes of the wealthy people. This affords a route of fifteen to sixteen miles, which means that many people will be tempted to take advantage of the improved streets and highways.

HINTS ON FILING, HARDENING AND TEMPERING

WHILE a high degree of skill in the use of tools is hardly to be expected from the man who handles them only occasionally, a fair working dexterity may be gained by practice and care, and there are very many little jobs that the automobilist can do for himself, if he will, and save time and the expense of going to a repairman. There are excellent reasons why every automobilist should have a working knowledge of the use of tools. If he is a man of moderate means he can cut down his running expenses very considerably by doing his own odd jobs. If he is mechanically inclined and likes the work, he will get a certain amount of pleasure out of it in addition to the saving in hard cash. If he has plenty of money he ought to know what to do in case of emergency, for all the "long green" in the world will not conjure up a repairman where none exists; cars sometimes choose such localities to go wrong, and the unversed automobilist must perforce fold his hands and review his past life until someone comes along and gives him a tow.

The Art of Filing.

In these days of milling machines, shapers, planers and grinders, the art of filing has become almost a lost art, and the man whose boast was that he could "file concave" has practically gone into oblivion. Nevertheless the file is indispensable, and the automobilist who expects to do his own work must learn to use it. Of course anyone can grasp a file and drag it back and forth across a piece of iron, and wear down the metal; but that is not filing. The teeth of a file are cut so that they point toward the toe of the file—the end opposite the handle—and they do their actual cutting only when the file is pushed forward. Therefore the filer's weight should be put on the tool on the forward stroke and the file brought back without pressure. Putting pressure on the file during the return stroke can only result in a waste of energy and a slight scratching of the work. It will usually be found easier to file true on a flat surface if the file is allowed to rest on the work on the return stroke. In order to work comfortably and get the best results, the vise in which the work is held should be at the height of the elbow. The file should be held with the ball of the handle resting in the hollow of the palm of the right hand, so that one's weight can be comfortably applied; the base of the thumb rests on the toe of the file if the tool is a large one. In the case of a small file the toe is held between the thumb and first and second fingers. These are the methods the mechanic will eventually work into by practice, and he might just as well start right in the first place.

In filing flat surfaces, the trick is to make the file travel in the same plane at all times and avoid rocking it or tipping one end or the other. The beginner will find that on putting his weight on the file and pushing it across the work, the tool will tend to slant downward at the end that projects most over the work, and as first one end and then the other is the longer, there will be a rocking motion that will give the work a rounded surface instead of a flat one. To counteract this the filer's weight must be shifted as the stroke progresses. At first, when the toe of the file is on the work, nearly all his weight will be on the left hand, but as the file is pushed forward the weight must be gradually shifted to the right hand until at the middle of the stroke the weight is equally distributed, and at the end of the stroke nearly all the weight is on the right hand, holding the handle. And to make the file cut, if it is a coarse one, plenty of weight must be applied.

Cleaning the File.

After a certain amount of use the teeth of the file will become clogged with particles of metal, some metals filling up the teeth more quickly than others. When this happens the cutting capacity of the file is reduced. Take a bit of wood with a square end and rub one edge of the end across the file, following the direction of the teeth, until the wood is cut into teeth itself and will clean out the file. By rubbing the file all over, shifting the stick along from one section to another, all the teeth can be thoroughly cleaned. If the clogging particles are particularly stubborn, take a piece of rather thin sheet brass and use the edge in the same way. Rubbing chalk into the teeth will delay the filling up and make the cleaning easier, though if too much chalk is used the cut will be reduced. It is a good practice to give a file a smart rap on the edge of the bench occasionally while working, to shake out the metal. Don't bang the file on the vise or other metal surface so as to break the cutting teeth. A good new file should not be used for filing lead, babbitt, zinc or other soft stuff, for the teeth will soon become so filled that the file will be ruined for harder metals. Keep an old file for such work. Soft metal can be removed only by melting it out, as a rule, and this process is apt to soften the file.

In using a smooth file to give a surface to a piece of work, rub plenty of chalk into the file and tap the file to shake out the particles of metal every few strokes. Otherwise the work will be found to contain deep scratches. If a coarse file was first used, the fine file must be worked until the deep marks of the coarse tool have all been cut out. A good finish can be made by what is called "draw-filing." This consists of working the file back and forth in the position of a draw-shave. A surface can be made to look very well by draw-filing with a smooth file and finishing with a piece of fairly fine emery cloth wrapped around a stick and used just as the file was in draw-filing. By using emery cloth of several grades of fineness, beginning with the coarsest and ending with the finest—crocus-cloth—a very fine finish can be produced.

When Filing Cast-Iron.

When filing cast-iron, be careful not to pass a greasy hand over the surface of the iron. If this is done the next stroke of the file will feel as if the cast-iron was hardened steel, and it will take some little work to get under the lubricated surface. The rough outer surface of an iron casting is usually intensely hard and is very difficult to file, to say nothing of the destructive effect on the tool. For getting off this hard surface use the edges and corners of old files, or, if possible, grind the casting on an emery wheel or even a grindstone.

Hard brass is hard on files; a partly worn file that will do excellent work on other metals will work very indifferently on hard brass, so a good new file should be kept for the purpose. Soft brass, of course, is very easily worked. Aluminum is rather mean stuff to file, but if the file is wet with turpentine there will be little trouble from the clinging particles of the soft metal.

Filing in the lathe is a very useful proceeding for some kinds of work, though it must be carefully done; if the object to be filed is a journal that is to run in a bearing, or anything of a similar nature, it will be found a difficult matter to leave the work truly round and parallel if anything more than a bare smoothing is required. If the object to be filed is driven by a dog or lathe driver, this should be secured so that it has no play, as the lost motion due to movement of the dog will emphasize the tendency to file flat spots.

Sometimes the amateur will find it possible to file a flat nearly true by holding the piece stationary between the centers of a lathe and working the file across it at right angles to the lathe bed. In doing this the lathe centers should be as nearly as possible in the plane of the flat to be filed. There is

a tendency to rock the piece on the lathe centers, and the greater the distance between the file, when cutting, and the centers, the greater the tendency to rock and cause the file to round the surface. Also it will be found that the wider the flat is the less tendency there will be to rock, and *vice versa*. Pieces that are of less than a certain width cannot be altogether prevented from rocking, though the tendency to round may be counteracted to some extent by filing diagonally across instead of at right angles. See that the back center is screwed up enough to hold the piece to be filed without looseness, but without binding.

Filing Sheet Metal.

Thin sheet metal or anything that makes a nerve-racking screech when the file is passed over it can be worked in silence and far more effectively by moving the file along its length or diagonally across, and should be held with the edge to be worked as close to the jaws of the vise as possible. The shriek of a file is, as a rule, unnecessary, and it also indicates wasted energy—for energy is required to make a noise, and that energy might just as well be turned to account.

Filing out a hole with a round or half-round file is a job that is decidedly difficult if the walls of the hole are to be kept anywhere near true and round. For this reason a hole should not be filed out unless a good deal of irregularity can be put up with. In using a round file always keep it turning so as to use all parts of it. A round file is hard to clean, so beware of using it for soft metal if it is to be used for anything else. Also, it is easy to break, and should not be rapped with the same vigor as a flat file when shaking out filings.

One of the most useful members of the file tribe, where heavy cuts are to be taken, is the square file. This offers four faces, and the faces are rather narrow, so that they will bite deeply; but the width is sufficient to prevent filing grooves. After a square file has been worn out in ordinary work it is just the thing for taking the skins off rough castings, having four sharp corners that will scratch through the hard surface very quickly. Old half-round and fishback files are also excellent for this purpose—a fishback file being convex on both sides, with sharp cutting edges.

Uses for Old Files.

Files that have been used until they are no longer available for the work for which they were made can be turned to good account in various ways. A triangular file, for instance, makes an excellent scraper. Break off the end until the point is reached where the width is right, and then grind off the teeth on all three sides and grind the end smooth and square. For some classes of work an angle will work better. Scrapers may also be made from other kinds of files, especially those of the half-round class. Fine center-punches can be made from old round files. Break off a piece and soften by heating to a bright red and leaving it in the ashes to cool slowly—the slower the better. Or better still, put it in slacked lime to cool. Grind or file down to the required shape at the ends, leaving the file teeth to form a checkered grip in the middle. Harden and temper.

Files with their ends properly ground make excellent hand turning tools for metal. Their hardness should be tempered somewhat, however, to avoid breaking, and back of the cutting part they should be made quite soft. The file teeth are sometimes an advantage, giving a grip on the seat. If these are not needed they can easily be ground off. A splendid scraper for scraping up brasses—bearings—can be made of a half-round file. Simply grind off all the teeth, leaving the longitudinal edges smooth and sharp, and use them in the scraping operation. The curve of the blade will allow a high spot to be reached, but the curve is so gradual that there is little danger of digging holes in the brass. Scraping is a pretty delicate operation, however, and should be very cautiously undertaken by an inexperienced hand.

On Tempering and Hardening.

A word on hardening and tempering may not be out of place here. The expressions "hardening" and "tempering" are very commonly regarded as being synonymous, which they are not. Hardening a piece of steel is the process of getting it as hard as fire and water will make it—as a mechanic would say, it is "hardened right out." When in this condition, however, the steel is exceedingly brittle, and while it is almost as hard as glass and cannot be worked with cutting tools, it is so easily broken that something must be done to make it less brittle. This involves the process of tempering, in which the steel is made softer and tougher. A certain amount of hardness has to be sacrificed for the sake of getting ability to resist blows or sudden shocks.

Hardening, as ordinarily practiced, consists of heating the steel to a cherry red and plunging it into water—quenching—holding it there until cold, or nearly so. Tempering consists of reheating the hardened steel, the heat softening it. The hotter a piece of hardened steel is made the softer it gets, up to a certain point, and when the desired point is reached the steel is again plunged into water and the softening is checked. The progress of the tempering or softening can be observed by cleaning the steel with a file or a bit of old grindstone, or anything that will rub the black off, and watching the indicative colors that appear successively.

The common machine-shop method of tempering, say, a center punch, which must be hard at the point and soft and tough elsewhere, is as follows: The tool is heated to a good red heat for an inch or so back of the point to be treated. Then the whole is dipped quickly in the water vertically, and instantly withdrawn until only about an inch of the end remains in the water; this is left for a few seconds to harden thoroughly. The point will now be cold, in mechanic's parlance—though really it may be too hot to touch—and the part that was only partly cooled will be very hot. Taking the punch quickly from the water, the mechanic rubs it bright at the point and watches it. The heat from the hot shank will commence to travel along to the point, softening the steel as it goes, and the condition of the vital part—the point—can be seen at the bright spot. The bright steel will assume a very light golden color, and this will deepen, more or less rapidly, according to the intensity of the heat remaining in the shank, passing through various shades of straw-color and yellow to light and then dark brown, purple, and finally dark blue—almost black. For the tool in question the correct hardness will be indicated by a rather deep straw-color. When this color appears, the steel is quickly plunged into the water and left there until cool. This method is very commonly employed for tempering all sorts of small tools, such as cold chisels, drills, lathe tools, and so on. Care must be taken not to leave the hot part of the tool too hot, or the colors will flash by so quickly that the right one cannot be caught in time. On the other hand, if there is not sufficient heat the tool will have to be reheated. An advantage of this method is that there is no sharp line between the hard and the soft parts; sharply defined division here would mean an easily-broken tool.

Small drills and other tools that have not sufficient body to hold the heat for tempering—the heat being dissipated very quickly—can more easily be managed by first hardening the point outright and then tempering with the aid of a piece of red-hot iron, a gasoline blow-torch or even an alcohol lamp. Lay the shank of the tool—not the point—on the hot iron or hold it in the flame until the color shows signs of changing, and then remove it and watch for the proper color. This gives time enough to catch the color. After cleaning a spot to show the colors, rub the hand or finger quickly over it, which will cause the colors to show true. When plunging the tool in the water the best results are obtained by dipping vertically, as the steel is not so likely to warp or crack.

LETTERS INTERESTING AND INSTRUCTIVE

Compression in Two-Cycle and in Four-Cycle Engines.

Editor THE AUTOMOBILE:

[419.]—A motor boat enthusiast who is a friend of mine is attempting to prove to me that his two-cycle engine, of the ordinary three-port type, always works with full compression, regardless of the degree of throttling. A four-cycle engine, he says, does not work similarly, the compression being lowered in proportion to the degree of throttling. I can understand this, but do not just understand why the same should not be true of the two-cycle. If you will enlighten me through your valuable query column, you will enable me to cover up my ignorance the next time I am inveigled into an argument on this subject. G. W. B.

Keokuk, Iowa.

The fact that the exhaust gases in a two-cycle engine are expelled chiefly by the displacing action of the fresh incoming charge, is the secret of the difference. In a four-cycle engine throttling reduces the area of the passages through which the fresh charges must be inspired, with the consequence that there is considerable "wire drawing," resulting in corresponding attenuation of the mixture. In this way as little as one-eighth of a full charge may be drawn into the cylinder, which, when forced into the compression space, naturally will not be under much pressure. In the two-cycle engine the conditions at the end of the power stroke involve the opening of an exhaust port, immediately followed by the opening of an inlet port. After the first blast of the hot gases cut through the exhaust port, there is nothing to displace the remaining contents of the cylinder except the scavenging action of the charge coming in through the inlet port, so that if by throttling the incoming charge be reduced, the displacement of the exhaust gases is reduced almost in exact proportion, with the result that the cylinder commences its compression stroke with a full charge of gases at an invariable pressure for the speed and the make of engine. The only effect of throttling will be upon the proportion of the new charge to that of the burnt gases, rather than upon the sum of the two. Consequently, the compression will be normal through all degrees of throttling.

The Air-jacket System of Cooling.

Editor THE AUTOMOBILE:

[420.]—Will you please let me know what was the first instance of the application of the air-jacket system of cooling automobile cylinders, such as is used on the Frayer-Miller and Trebert motors? I have heard it stated very positively that this system is quite old, and is anything but a recent American invention, as it generally is supposed to be. If you are acquainted with the facts in the case, I will consider it a great favor if you will let me have them.

Westfield, Mass. T. R. PERRIN.

The first really practical motor vehicle engine ever built—the one applied by Gottlieb Daimler to his first motorcycle, in 1885—was cooled by an air jacket through which air was forced by the fan action of the flywheel. Apparently because of misconceptions regarding the heat developed in the operation of such an engine, and because of the lack of available data on the subject, the principle was discarded without proper trial, chiefly on account of the fact that Daimler found it expedient for commercial reasons to continue his investigations along the line of marine service, under which conditions plenty of water for cooling is of course available. Engines thus being developed for marine work, which operated satisfactorily and with high efficiency, it was only natural that when the new motor again was applied to automobile service, the most satisfactory form in use should be adopted for the land conveyance. Despite this very early anticipation of this system of air-cooling, much credit is due to its present exponents for the high degree of efficiency to which they have developed it, and the history of the idea constitutes simply a characteristic illustration of the fact that the most meritorious ideas may by the combination of circumstances be caused to lie dormant for years, without fair trial.

Two More Individual Opinions on Back-firing.

Editor THE AUTOMOBILE:

[421.]—In your issue of Sept. 6 R. C. Stetson asks for a remedy for his two-cycle engine from back-firing. Will give a little experience along that line. Not long since I was to see a two-cycle engine that was back-firing badly and would often stop the engine. I concluded that there was some foreign substance in the cylinder that would hold fire and ignite the incoming charge ahead of its time, but as the engine was wanted for immediate use I would not delay matters by taking off the cylinder head and cleaning it, so thought to try kerosene to dislodge any substance that I thought was causing the trouble, so removed the spark plug and put in about three tablespoonfuls of kerosene, put in plug and started engine; in a moment it was running nicely and did so the rest of the day and has continued to, so far as I know.

And in the same number E. C. Woodlock asks, Why not larger wheels for autos? There was a time I thought the same, but with some use of a motor car I was convinced that the low-wheeled car was much the best, especially for country roads, and the larger wheels would have to be so much heavier to stand the strain that would come of them in sidling places or turning corners, and increased danger would always accompany the larger wheels, and I have some time since decided that the weight of an auto should be low down for speed and safety; without either motoring would lose much of its pleasure, and one of the best ways is with the low wheels. L. C. GREENE.

West Branch, Ia.

Undoubtedly Mr. Greene's theory concerning the premature ignition in the two-cycle engine is the correct one. Probably an excess of lubricating oil had carbonized with the formation of some flakes that held the heat and these flakes were cut out by the kerosene. In reference to the matter of large wheels versus small wheels, Mr. Duryea's letter in this issue will supply some good arguments that contradict Mr. Greene's. Large wheels have to be only a very little heavier than small wheels, because the limit of the side strain they must endure is not that due to centrifugal force consequent upon the mass of the vehicle, but that set by the adhesion between the tires and the road. The spokes cannot receive a greater stress than that necessary to make the tires slip sidewise on the road surface. As for the weight of the car being carried low, undoubtedly it should be so carried, but this is just as practicable with large wheels as with small, its provision involving nothing more than "cranking," or dropping, the axles.

"Hunting" in Planetary Gears.

Editor THE AUTOMOBILE:

[422.]—I have often wondered why it is that the planetary gear, which seems so compact and simple in operation, should be so noisy, even when given the best of care. I have had several cars that were provided with planetary transmissions, which in most cases seemed to be very well made, with teeth cut accurately and the fitting and assembling done carefully, but without exception they gave me considerable trouble, both in respect to wear and noise, despite the most careful attention and frequent and thorough cleaning, and experimenting with almost every approved lubricant. I have noticed that sliding and individual-clutch gears, working under even heavier duty, with only single pairs of gears to transmit the power, and frequently made of poor material, inaccurately machined, give quieter service even when handled by careless and incompetent operators. E. H. CHANDLER.

Goldfield, Nev.

The facts to which you refer constitute a recognized defect in the ordinary type of planetary gear and are due to what is known as "hunting"—a sort of regularly-recurrent transposition of the driving stress from one of the planet pinions to another, due to the absolute impossibility of so fitting these pinions that the duty is evenly distributed upon all of them at the same time. When it is considered that most planetary gears have at least two pinions, while some even have three, through which the power is transmitted at the same time, it can be realized that it is a very delicate matter to secure such correctness of tooth profiles and of mesh as will divide the duty as it should be divided. Even the finest gear-cutting machinery obtainable, supplemented by the

most competent assembling and adjustment that it is possible to secure, proves inadequate to the overcoming of the difficulty. There is really no particular reason why a plurality of planet gears should be used to transmit the power, and it has been proposed by some authorities of high standing to substitute one or more blanks for all but one of the pinions, equivalent in weight to the working pinion, for the mere purpose of balance, which is really the only justification that exists for more than one pinion. If two pinions in a sliding or individual-clutch gear system can transmit a given power, there seems no valid reason why a single pair should not be made to serve equally well in a planetary gear.

Closed and Open Crankcases.

Editor THE AUTOMOBILE:

[423.]—What advantage is there, if any, in having the crankcase of single cylinder automobile engines closed to the atmospheric pressure? Of course I understand crankcase should hold oil and be so constructed at not to splash out, but it seems to me that on the power and suction stroke there must be quite some back pressure by reason of the air being compressed in crankcase. Again, on the exhaust and compression stroke there must be a slight pull on piston by reason of the partial vacuum in crankcase. Do these conditions exist in practice, and would it help speed of engine to have two-inch vent to crankcase? Or should crankcase be made tight as possible? What advantage is there in the long wheelbase over the short? Your illustrated subjects on automobile construction with all details is very instructive, and I look forward every week to the coming of THE AUTOMOBILE, whose pages are so full of information for every automobile owner, whether he drives his own car or not. I hope by constant reading of THE AUTOMOBILE to be able to master every prank my machine can play on me.

J. A. JOANS.

Jersey City, N. J.

If a crankcase should be made absolutely airtight, there would be no power wasted in compressing and rarefying the air contained in the crankcase, because each instroke would neutralize an outstroke. Thus, on a compression stroke, the air in the chamber would be extended, but on the succeeding explosion stroke there would be a compensating tendency to suck the piston back. Similarly, should it be a case of the crankcase air being compressed during a suction stroke, the power required for such compression would be given back in expansion during the succeeding exhaust stroke. Practically, however, it is impracticable or impossible to construct an airtight crankcase, with the result that the to-and-fro movement alternately forces the air in and out through numerous small openings—such as those around the bearings, between the different joints in the crankcase and between it and the cylinder, etc., with the effect that a material percentage of the power is lost. Because of these facts, it has become established practise with the best designers to provide "breathers" for the crankcases, consisting of openings protected by vertical tubes or standpipes, closed with wire gauze, to permit the free flow of air without the entry of dust or the escape of lubricating oil. The necessity for some such provision can be readily appreciated by holding the hand over the opening in the top of one of these breathers, to test the compression and suction that is produced.

"HELPING" THE AUTOIST AT TWO DOLLARS PER.

Asbury Park, N. J., September 29.—Jersey farmers residing along the roads at the seashore patronized by autoists have an eye for business. For some distance the road leading into Tom's River is torn up from side to side, and when an automobile strikes the heavy Ocean County sand the car cannot make much progress. It is charged that the men responsible for the present torn up condition of the highway are delaying the repairs so that they can profit by the misfortunes of the autoist, for no sooner is a car stuck in the sand than a farmer and his team appears on the scene with an offer to pull the machine out for a two-dollar bill.

BOOKS FOR AUTOMOBILISTS.

New Edition of "The Car" Road Book.

British automobilists are well provided for, so far as general road data and other motoring information is concerned, by a road book edited by Lord Montagu, editor of "The Car," an influential English automobiling weekly, whose representatives compiled the greater part of the data in the book. The subjects included in the work are numerous, covering practically everything the automobilist is likely to think of. Numerous maps give touring routes, with detailed information as to roads, stopping places, garages and repair shop facilities and so on. Each route is shown by a separate map, and the routes and maps are well indexed. In addition to this data, there are tables of lighting-up hours, information on road rules, on automobile taxation, regulations governing the use of automobiles in other countries, an explanation of road signs, a directory and gazetteer of the towns of the various routes (this section alone filling 163 pages), and an encyclopedia of everything pertaining to the car, beginning with "Accelerator" and "Accidents" and ending with "Wheels" and "White Metal." The book contains 590 pages and is bound in russet leather; the back cover has a flap which tucks into a pocket in the front cover, protecting the edges and preventing the book from flying open at inopportune times. A pocket in the back cover contains a set of road maps of large size, extremely useful for laying out tours in conjunction with the small maps in the book.

A New Automobile Textbook by C. E. Duryea.

The American School of Correspondence, of Chicago, Ill., uses as a text-book for its automobile course a book entitled "Automobiles," written by Charles E. Duryea and illustrated with many half-tone and line engravings showing the various component parts of automobiles, and complete cars of different types. As might be expected, the book is a practical one and the information contained in it is set forth in plain, easily understood language. The volume is wound up by an examination paper, the questions in which cover the whole ground gone over by the text in a brief and comprehensive manner. The book contains 88 large pages and is neatly bound in cloth.

VIRGINIA WANTS THE 1907 A. A. A. TOUR.

Apparently Virginia very much desires the 1907 A. A. A. tour to have its destination at the Jamestown Exposition. A letter to Augustus Post of the Touring Committee from C. B. Richardson, of Harrisonburg, Va., tells of highway improvement already begun. Referring to the Shenandoah Valley Pike, Mr. Richardson writes:

"The pike company has agreed to place at once all modern crushers on its roads, and to put the pike in fine shape for spring traveling. At present the company has a large force of workmen putting on new metal, and purposes keeping this up until late in the fall. However, next spring no metal will be spread over the roads, which means that it will be in perfect condition. Another big thing, the company has agreed to take out the waterbreaks, which job will require some time. You can say for a certainty that we will have a grand road for the 1907 tour if its destination is Jamestown."

OLD "999" TO COME BACK TO LIFE.

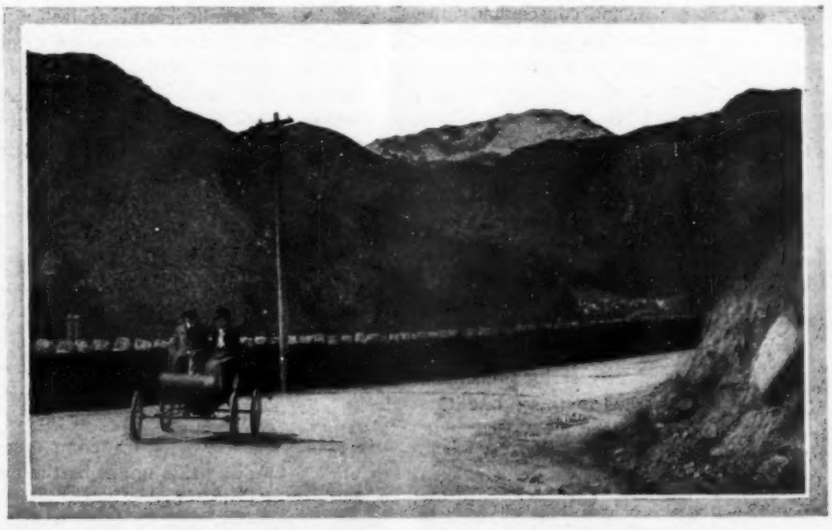
Los Angeles, Cal., September 27.—"Old 999," the racer built by Henry Ford, and which made the first fast straightaway mile, is being put in shape and will race again. Bruno Seibert is rebuilding the old car in Pasadena, and it will be tried for a world's record within the next couple of months. A stretch about eight miles from Los Angeles has been found which will be suitable for record breaking. It is the bed of a dry lake, and is even better than the beach for time.

PAYING THE PRICE OF EXPERIENCE

By T. B. RENNELL.

A LONG time ago, when an automobile was as unusual as a flying machine now is, I purchased a gasoline runabout, a little curved-dash affair, born in the year 1900 A.D., which, after all, was really a marvel for its day and age. As I look back on those times, when the highest-priced cars were most faulty and unreliable things, very limited in their usefulness, my pioneer certainly glitters with brilliant achievements and virtues by contrast. At the time I am writing about I lived in Florence, an oil-producing town in the Arkansas Valley, 152 miles south and west of Denver, measured along the railroad. No automobiles at all were owned in that city, nor, in fact, in that countryside then, and the advent of my spiderlike machine was looked on as a very doubtful experiment, which I might regret to at least the extent of 650 hard-earned dollars. The auto generally was limited in use to city streets and park boulevards, so I had no precedents to encourage my venture and no data to justify it, nothing but the indomitable auto fever, which never abates until the patient possesses a troublesome car; then it sometimes leaves suddenly and violently.

While I lived in the town I had charge of a plant some seven miles out in the country; had been riding and driving horses to and from the mill, and they had proven so unsatisfactory that I determined on an automobile. Action followed determination so rapidly that I gathered my wad and left town on the midnight train, reaching Denver at 7.30 in the morning, and purchased my car; fully aware of the chances I was running, but resolved to be a sport and bear the risk. The machine was demonstrated and run; a planetary transmission was shown me; parts of the engine were displayed, a book of directions given me, and then, with the beginner's elementary grasping of general principles, I thought I knew it all.



NEAR COLORADO SPRINGS ON THE BOULEVARD FROM MANITOU.

Homeward Bound in the New Car.

I resolved to leave for home the next day, and engaged a repairman from the shop to accompany me. The road was fine and we surely did hike along, rolling through Littleton in fine time, incidentally scaring every horse we met—some nearly turned inside out. So far, so good. The little car kept churning at it, and we were killing ground at the rate of fifteen miles. A way out of Littleton the country began to roll, and occasionally I had to get out and push, but this auto-enthusiasm is hard to quench; once in a while I would feel a little apprehensive, then would pull myself together, and with a sickly smile assure the other fellow that she was a dandy. At Sedalia we had to take on water; when we stopped I could hear a gurgling sound; the mechanic said it was boiling water, and so we drained off a bucket of steam and filled the tank with nice cold water. In the course of our travels the engine would seem to get faint and tired occasionally, and at such times the owner had to push hard and muscularly; whatever caused these passing troubles, the mechanic thought it expedient to stop awhile, and then when we started the engine would puff along, cocky as ever.

Up to this point the ride was exhilarating, and viewed in the light of subsequent doings, was uneventful. At Castlerock, however, we ran into a storm, a wonder, too, the kind that only our western prairies know; suddenly, in a cold, gray sky that looked as hard as flint, the windows of heaven opened, and rain, sleet, snow, and pitchforks came down to beat a royal flush; then our road, which had been generally fine, became one slippery, sloppery mass of the most vicious lubricant. The car did stunts you read about; while the wheels labored in one direction, the car headed in another; she would spin end for end, winding up in an irrigating ditch, from which I had to push her to high ground again—an exhilarating experience.

The rear axle was an encased affair, containing the differential and sprocket, the chain for which ran through slots. This naturally got full of mud, that ground away at an entertaining rate—for the repairman. Nothing else startling happened for a while; the car, having gotten somewhat accustomed to the mud, seemed able to guard against violent and hysterical gymnastics. The mud got more serious and less lively, as the rain continued and soaked in, and I jsut want to state that pushing began to assume fearful proportions, my eyes bulged out and breath came short and thick. The only time I did not have to push was down hill.

At last we waddled into Palmer Lake, where the motor took rest and refreshment. Water had been boiling and boiling, and with this demonstration of contrariness, the power of the motor began to grow beautifully less, every faction of a mile traveled. The radiator, for some asinine unreason, was flat and under the footboards, the designers could not possibly have tucked it away in a spot freer from the danger of catching cold. For the sixth time we took on water; if we had been driving a flock of elephants through Death Valley on a summer day, we would not have used more of the precious liquid. Full of good cheer, we left the Lake, and boldly sallied forth; the little rest, or rather the cooling off, probably helped the engine, for it whirled us along at a lively clip.

We were running down a steep road, cut in the side of a high wall, when suddenly, crack, jing-a-ling, and the car streaked for the precipice edge we were skirting. Mr. Driver had the brake set in a second, just as our front wheels were bidding farewell to the road. "What's up?" "Tiller spring broken!" He called it a certain kind of a tiller spring. I hopped out and put stones under the wheels, as the brake had no means for locking; then his highness stopped the motor and left his seat to examine things generally. What a vocabulary he had. Describing things was evidently his naturai vocation. Finally, when he got through airing his views on the matter of steering gears and auto designers, we pitched in, and by the aid of a piece of barbed wire hacked from a nearby fence, we bound up the flimsy spring, then

IT BEHAVED WELL WHILE THE REPAIR MAN WAS AT THE HELM.

crept cautiously downhill to a spot where the road was wide enough for us to turn around. We slowly labored back to the Lake, hunted a smith, and had the spring welded.

The rain had kept up most of the night, and consequently the road was horrible, and I had many occasions for appetizing exercise. We boiled water, refilled the tank, monkeyed with the engine, all in the most solemn and matter-of-fact way, but still managed to keep moving along pretty steadily; however, nothing real exciting occurred.

Pulled into the fine streets of Colorado Springs, splashing into puddles and whirling sprays of muddy water away into the air. It was Sunday; I had forgotten; but as we sailed along the level macadam, could hear devout people singing hymns, then swinging around a corner, ran past a beautiful church, surrounded by an army of horses and carriages. Maybe our sudden appearance didn't strike consternation to the equine host! They danced and lunged, bucked and kicked; tugging at their moorings and snorting, they cut a picturesque figure. It was pretty serious business, but I nearly died laughing; had never seen anything like this before. Contrary to my expectations, the driver let the car out, instead of stopping to consult with the horses, and we shot by, probably in good time, for a couple of the skates broke loose and offered to race with us. Just as we were getting dim in the horizon some enraged but respectable citizens hustled out the church door and gave chase; it was only our speed that kept us out of jail that memorable Sunday. The rain, which had been hanging over us all day, let go again; so we ran into a bicycle shop on the outskirts of town, and quietly put up for the night. It was still raining next morning, so I paid off the mechanic and sent him back to Denver, while I returned home by train.

Navigating the Machine Without Expert Aid.

The best part of a week elapsed before I ventured to the Springs again, and even then the roads were bad, in spite of several fine clear days. We were 75 miles from Denver, and 77 from home, according to railroad calculations. I carefully inquired about roads, and found I had two choices, one to follow the track, which would probably be very heavy, as it was all adobe; the other was to cross a range, the foothills of Pike's Peak. I chose the latter, and after spending a day practicing on the car, left one fine morning, having engaged someone to do the pushing, which I felt would inevitably fall to our lot. That was certainly a dream of a trip. Although it happened five good full years ago, every detail is as fresh as ever. We left town at six; the morning was cold and frosty, but fine and clear. We sailed past Helen Hunt Jackson's grave and other cheerful spots, dear to the heart of the Springs, and then began to climb—we were negotiating the approaches of Dead Man's Canyon.

As luck would have it, the cursed car was not developing half power, and there I was alone, with my halo of responsibility. Ever and anon I stopped and consulted the instructions. Explicit directions about spark plugs; all right! So I pulled out the plug, which happily was very conveniently located, though, strange to say, this part never gave me one minute's trouble all the time I owned this particular car. Well, I had as fine a string of fat purple sparks as anyone could desire; the plug was nice and clean, and everything about the ignition looked fine. After this, they cautioned us about water in the gasoline, telling us to examine it in a pan, and if it separated, to throw out the whole batch; gasoline showed up all right—trouble evidently not there.

They had the fanciest carbureter ever, on this most remarkable car; a diaphragm pump, worked by crankcase suction and pressure; kept a vertical cylinder full of gasoline, which flowed through a nozzle spraying over a screen. Air was drawn through a burlap-covered mitten, and took up all the gasoline it needed, the balance of the oil that flowed over the screen gravitated to the tank bottom. This vertical cylinder had an auxiliary pump, of the plunger variety, for priming the carbureter on starting, and it also came in handy if the diaphragm quit business. I was destined to many handshakes with this same pump before the familiar scenes of home greeted us. Well, I pulled all of this wonderful but ingenious carbureter to pieces and put it back; everything seemed to drip and screen and work right, severally and generally. However, we cranked and cranked, with nary an explosion; the other fellow cranked, and at last a smoky, foul-smelling shot, followed by gravelike silence. I monkeyed with the carbureter adjustment in front of the seat, and at last she went off; for fear of her stopping again, I shoved into low gear, yelling to my man to scramble on some way.

A Cheerful Experience with the Rear Wheels.

The engine sulkily puffed and panted, not at all like the lively little cricket I bought in Denver. We crept along, and along; water boiled, none in sight—let her boil! At last the whole combination became too utterly disgusting. Determined to fix something, I stopped the engine and went all over the car, swearing like a half-breed. It seemed a pretty scrub trick to turn out machines that required college professors to run! But, nevertheless, it had to go; it had to get right, and that was all. I got the strong man to lift one end of the rear axle, in the course of my researches, and found the wheel turned very hard indeed. I had heard about differentials, or "comp. gears," as the shopmen called them, and thinking this might be the cause of the heavy working, blocked up the other end of the axle, so the shaft would run free; still tight and very hard to turn; that settled it. I looked over the axle and found it screwed together at the differential casing; had no tools for tackling such a job, the outfit with the car consisting of an oil can, a couple of S wrenches, a sickly chisel, a small monkey wrench, and a pink-covered instruction book. Well, I would run on a while, and maybe we would encounter a ranch. We did, but not for several miles, not, in fact, until we entered Dead Man's Canyon, and passed the grave of the deceased party in whose honor the gorge was named.

A windmill hove in sight, we steered for it, cruising over boulders and ruts, finally navigating our way into the barnyard. After a short consultation with the proprietor we looked over his tool-chest; an axe, foot adze, big monkey wrench, some blacksmith tools and some harvesting machinery—cheerful outlook for my repair job! Well, I had cussed too much to be outdone now, so we blocked up the side bar springs, opened the chain, loosened the spring blocks and pulled off the axle, laid this on a couple of trestles and got after the wheels. One came easily, but the other stuck like grim death. These wheels were simply keyed and pinned, and the tight one had evidently been loose, so some mechanical genius riveted the end of the shaft over—was it any wonder we had trouble getting things apart?

We filed the differential as smooth as possible, then put the axle together, but instead of screwing it up tight, as it had been, that is up to the shoulder, we put a band of wire on the thread and screwed up solid to that; this spread the casing and allowed the shaft to spin around. The casing had originally been set by a

small machine screw, threaded into both halves; this we had to leave out; were also obliged to readjust one of the spring seats. Then all was ready for the start, and sure time it was to be going, as we were a terrible space from home.

The motor started on the third turn of the crank, and went off briskly, just like its old self. I did not know what struck it. How good it felt to be moving again! And how soon one forgets his disagreeable experiences! As we sailed along I was in a most ecstatic state of enjoyment, all the discouragement of half an hour ago melted in the sublimity of the moment. In the satisfaction of going again, I forgot we were riding a junk pile whose components had evidently been thrown together from various altitudes. I forgot that on hills the brave engine dwindled down to one small-sized mouse. But what's the use of spoiling a dream? We were traversing a flat part of the canyon, and certainly the car moved along at a pleasing clip. It was well past high noon and we hungrily ate our lunch while the car coughed explosions at the retreating miles.

How We "Kangarooed" Dead Man's Hill.

Soon we came to the head of this glorious canyon of red rocks and green trees, and started to climb a real hill. I threw into low, as the engine slowed down, and asked my Hercules to make ready for the push. I speeded the engine, slammed in low and yelled to the pusher—the last two actions were simultaneous. We often had to do this, so I invented the convenient name of jump, to express these various doings, on account of the lunge forward that the car gave when low gear took hold at the high engine speed. We kangarooed along, making about eight feet at a jump, sometimes less, and at last reached the top, then we spread our wing and sailed. I was still hopeful, not so much in the car as it was, but in its possibilities. While I knew practically nothing about gas engines, my experience with steam power made me certain that so large a cylinder as 4 1-2x6 inches surely would do better than that one was showing up. On high gear the ratio was three to one; on low I believe it was about nine to one, and if that big cylinder were working anywhere near capacity it certainly would have sent the light car over the hills flying. In the course of time, as I became more familiar with the machine, I did get very satisfactory results from it, and negotiated the Dead Man's Hill more than once in a creditable manner.

Returning to the windy mesa over Dead Man's Canyon, we actually rolled on smooth and uneventfully for half an hour, then encountered a man whose "hay motor" had run away and left him and his buggy all alone in the world. We put on a big front, had all kinds of power to spare, could drag him up a telegraph pole, meanwhile praying there were no hills ahead, and lashed his shafts to our rear axle by means of his holdback straps. The road happily continued to decline or roll along the level, so Uncle Reuben's whiskers were treated to an unusual airing. At the foot of a hill we came to a ranch, and there unloaded our trailer and its freight, which freight immediately proceeded to borrow a horse and search for his lost broncho.

Fixing Up a Broken Crankcase.

All this time we had been running through glorious mountian scenery, on a road that would have been excellent but for the very recent rains; great red rocks and wooded hillsides, with stretches of perfectly level road, made things mighty enjoyable, now that trouble had let up a little. We dropped into Beaver Creek and forded, splashing through water alarmingly deep, but got over all right and commenced the ascent to higher ground. It certainly was a pleasure to tour in this ideal way, especially as trouble had deserted us wholesale—so we thought, and so we congratulated ourselves, then suddenly, pound, knock, rattle, rattle, rattle—for the love of mud, what's up now with this cursed physical wreck? The noise kept up cheerily, but in spite the car continued to climb; still the hammering, and still the jerk, jerk, jerk, of the single-cylinder power impulses. I listened with all my might, and schemed and wondered with all my faculties. Could it possibly be something loose in the cylinder? No. That was clearly out of the question, for by this time it certainly would have been caught between the piston and cylinder head. What could it be; the noise seemed to follow every power impulse. At last we came to level ground, and stopping the engine, I pulled away the leather fall, and throwing off the seat cushion, dove into the engine. Well—here it is! Somebody hold me, I'm getting pious! The bolts that held the caps of the crankshaft bearings had broken, and here were the caps flapping to the national salute!

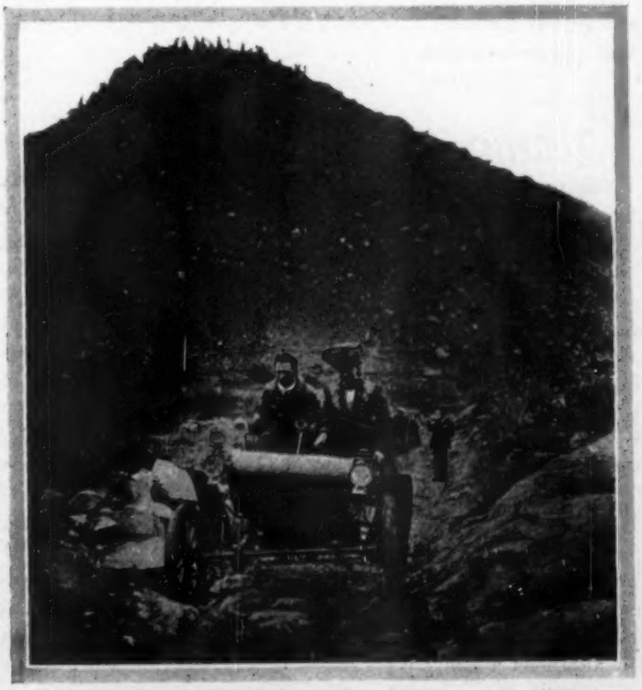
The crankcase of this ingenious engine was split vertically through the bearings, and was held together by cap screws, a tight joint being necessarily preserved, in order that the gasoline pump might be operated. The rear, or cylinder, part of the case contained half of the bearings, whose caps were bolted by two small stud bolts each; against these caps all the explosions pounded and battered, and yet 7-16-inch bolts were supposed to hold things.

Three of these bolts had broken; two on one side, and one on the other. Some complications of parts prevented the cap from falling off, and so at every power stroke these caps rattled and knocked. Possibly the affair would have stuck together until I got home, but I was not for chancing with it; with a sigh long enough to anchor in midocean, I started to figure on what to do. Ah, a thought! I sent my man up and down the road to spot a ranch house, and presently he came back with the news of one, just around the corner up a gulch. I went there, bought an old broom, and borrowed a saw and some nails; then cut the broomstick into lengths and drove a nail in one end of each. This nail I put in each of the defunct bolt holes of the caps, and drove the other end of the stick against the angle-iron frame; this made a strut that held the cap tight for a long time, and it certainly was a long time before I ventured on such a difficult repair job as to drill out the old studs and put in new. A perfect labyrinth of parts, and every part in the way of every other part; even the outside parts were buried and obscured, for some modest reason.

We did not lose three-quarters of an hour this time; so, very much elated with the effectual repair and short delay, I again started to track the veldt.

Showing the Car Off Before the Neighbors.

We pulled out of the mountains altogether now, leaving through a little gorge cut in the rocky hog-back, with its bristling capping of iron. Bidding farewell to the rocks, red soil and timber, we



NEGOTIATING A FEW BOULDERS THAT LINED THE ROAD.

headed pretty straight for a column of smoke and cloud that spelled "home" against the blue eevning sky; that's the place where, with such pride, I was to show off my acquisition, the little pioneer motor that was destined to establish the popularity of automobiling in those remote parts.

We were now in adobe again, and all along the road grew cactus and sage. Our way ran over the big mesa that banks the Arkansas from Pueblo to Canon City. there giving place to the mountains. The road dipped a little, and we did hum; chug-chug came at rapid intervals, and my delight again rose to 150 in the shade. Presently we ran across a horseman, driving a bunch of ponies. At first they were mildly interested in us; this waxed into genuine curiosity, and then, as we drew near, they politely gave us the road; they disappeared; they evaporated or something else; somehow they flashed from our vision. The car was going too smoothly after our many trials for me to be considerate, and I shot along regardless, while the bronchos danced to the four winds; kicking, bucking and jumping, they showed what they thought of their successor in office. Just one month before I had been over that same road, on a jaded horse, seeking another and fresher one; but now proudly and bravely I was scattering the brutes that had proven so unsatisfactory.

Things prospered until we got to the Union Mill, which hangs over town on the brow of the mesa; here we ran out of gasoline, and I drove into the yard, running up to the assay office, where I knew I could get gasoline, as they used it in muffle furnaces. We got into heavy mud, but in my excitement thought nothing of it, so I stopped and loaded up with fuel, then tried to get out; two or three lunges, then zip! The engine ran freely, but the car never budged. Quotations on automobile stock fell from 10 times par to 30 below zero. With a heart of lead, and the whole Union Mill jeering, I got out and made a post-mortem; it wasn't the chain; it wasn't the brake band—no! But it was the teeth of the low-gear pinions. These confounded things were made of some soft material to avoid noise, and at this pinch had strippde. We finally got out on the reverse, slid down the mesa hill on the brake, then backed into town, as I could not use high gear, because it locked into low.

Here ended by first experience in automobiling, and during its hours of anxiety and elation I felt all the emotions that the human soul is capable of. The vicissitudes of motoring soon became a matter of fact, however, and in later years, when I have ridden a rough road in a real good car, the trip actually seemed dull and uninteresting.

ORPHANS' DAY ACROSS THE BORDER.

Toronto, Ont., October 1.—About one hundred local automobilists turned out with their cars on Wednesday last to give the children from the orphanage and charitable institutions of the city a day's outing. The youngsters, 400 strong, gathered at the Legislative buildings, Queen's Park, in the morning. They were in holiday attire, and prepared to enjoy to the full the novelty of a ride in a real automobile, something that in their simple lives had exceeded their fondest dreams. A procession of gayly decorated cars filled with children was formed, which passed along some of the main thoroughfares of the city, thence to High Park, along the Lake Shore drive, and wound up at the Exhibition Grounds.

This fine auto ride was only the prelude to the fun. The children found an admirable luncheon awaiting them. Every boy was supplied with a mouth-organ and every girl with a doll. A Toronto wholesale firm of jewelers presented a handsome souvenir to each, while the York Mineral Springs Company was responsible for a consignment of one hundred bottles of ginger pop. In the afternoon a competition of games was held, for which prizes were given.

NOTES ON RECKLESS PEDESTRIANISM.

"It is a fixed and unalterable habit with some people to rail at what they are pleased to call the recklessness of persons who drive automobiles," remarked the man who drove his own car, wiping his greasy hands on his light gray trousers. "That sort of thing is all right as long as it is kept within reasonable bounds, but there are about as many criminally-careless pedestrians as there are reckless drivers, as I know from my own experience."

The driver paused long enough to give his listener a chance to ask for the yarn.

"Oh, something of the kind happens every few days, and I can't remember half of the cases. Only yesterday I had a little experience that made me laugh. I was driving along through dense traffic at a very slow pace, when one of those Mercury-footed boys in blue walked out from behind a trolley car with his nose in a dime novel. He walked right into the car before I had time to stop, even at that slow pace, and the front fender just passed under his elbow and gave him a smart dig in the ribs, shoving him out of the way without doing any damage. I half expected to hear a roar, or at least to see some signs of a scare, but the young man merely looked up, as if reproaching me for interrupting his reading, and continued his way across the road with his nose again buried in his ten-cent classic.

"The only real accident I ever had was caused by the recklessness, or whatever you like to call it, of a pedestrian. I was driving along an avenue which was traversed by an elevated railway, when a man who had been standing behind one of the big pillars suddenly stepped out, without looking to see if anything was coming, directly in front of my car. There was no time to warn him or to do anything but run into him or into a loaded truck; so, not having time to think, I put my helm hard over and crumpled up the front of the car on the truck. I wasn't hurt and neither was the man, who looked surprised, and doubtless wondered how long the law would allow them things to use the streets.

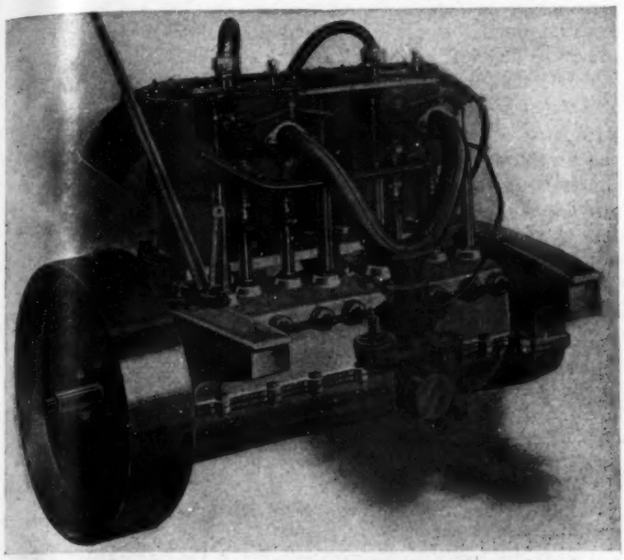
"Once I narrowly escaped mussing up a young lady who seemed to think that all the world's a sidewalk and all the people in it pedestrians. She was talking to another young lady on the curb, and, being apparently in a hurry, continued her conversation while she backed down off the curb and started *walking backward* diagonally across the road, while I gave the bulb of my horn one agonized squeeze and brought the car to a standstill with shrieking brakes, within a very few inches of the damsel's French heels. I was rewarded by a stony glare as the young woman walked off with her chin in the air, and if there had been another car coming she would have caught it sure.

"I had the tables turned on me once in a way that still makes me laugh when I think of it. I was driving along one of those broad asphalted streets that offer such temptations to energetic boys for playing games, when I saw a couple of lads piking along toward me as hard as they could pelt, one chasing the other. The foremost boy was looking behind him and coming straight at me, so I tooted the horn and slowed down. He was so absorbed in his game that he didn't notice me, so I was prudent and came to a full stop. And I'll be blessed if the lad didn't run bang into my radiator. Just at the last moment he saw the car ahead of him and threw up his arms to shield himself, but it was too late to stop. He didn't hurt himself or the car, but he was a horribly scared boy, and it took some time to convince him that he had butted into a stationary car.

Pennsylvania automobilists or automobilists taking their cars into the state of Pennsylvania will, after December 1, be required to display on their machines red enameled tags with white letters instead of the blue tags now in use. The new "decorations" will be ready to issue in three or four weeks, and will not differ from the old tags in any other respect than the coloring. Pennsylvania licenses cost $3, the revenue derived going to pay for maintenance of the automobile division of the Highway Department.

A FRENCH DESIGNED AMERICAN CAR

IN building the American Mors car the St. Louis Car Company, of St. Louis, Mo., has made only such changes from the original French model as are required to make the car suitable for our rough roads. The narrow French tread was widened to the American standard and the clearance was increased. Three models will be turned out for the 1907 trade—14-18-horsepower, 24-32-horsepower and 40-52-horsepower. The 24-32-horsepower



MOTOR OF AMERICAN MADE MORS 40-52 HORSEPOWER CAR.

car will be built in the greatest numbers, as it is expected to be the most popular type.

This car has a wheelbase of 106 inches, with 36-inch wood wheels running on Hess-Bright ball bearings. Framing is of pressed steel and axles of steel of approximately rectangular cross section; the steering knuckles are of the Elliott type and the knuckle bearing that takes the weight of the car is of the ball type. Both axles are dropped. Steering gear is of the worm and sector type, inclosed in a divided bronze casing which has arms for attachment to the frame.

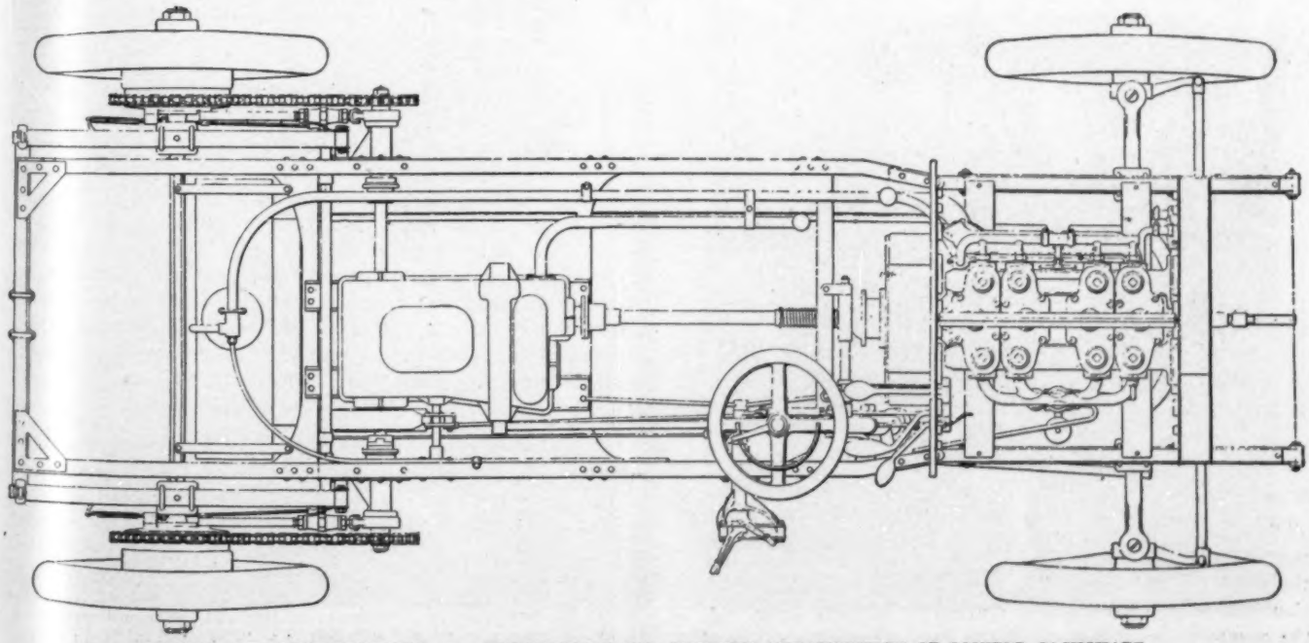
Several interesting features are incorporated in the four-cylinder vertical motor. The cylinders are cast separately, with integral heads, head jackets, valve chambers and valve-chamber jackets; the main water jackets, however, are separately made of aluminum and are attached by bolting, the joints being packed.

Inlet and exhaust valves are on opposite sides of the engine and are actuated by two camshafts driven in the usual way by gears at the front of the crankcase. Camshafts are of heavy steel tubing with each cam held by two pinned keys. The exhaust cams have double faces and can be slid longitudinally by means of a hand lever at the front of the car. One cam face is for the regular running lift of the valves and the other holds the valve open during part of the compression stroke and relieves part of the compression, so that the motor can be cranked without excessive exertion.

The crankcase is a single aluminum casting, the usual central division being absent. The ends are open, however, and the crankshaft is slipped in through the front end. The crankshaft has three bearings of Parsons white bronze, and in addition there is a bearing just forward of the valve camshaft gears. The motor has a bore of 4 1-4 inches and a stroke of 5 5-8 inches. Carbureter is of the float-feed type, with spring-controlled auxiliary air inlet. A rotary valve is provided for regulating the area of the air opening. The throttle is of the butterfly type, placed at the top of the mixing chamber. A water jacket around the carbureter is fed by a shunt pipe from the circulating water, keeping the carbureter at a constant temperature.

Two independent systems of ignition are provided—a jump-spark system and a make-and-break system. The former is used only for starting, the make-and-break being relied upon for regular running. An imported Mors magneto, gear driven, generates current for the make-and-break, while a storage battery and coil placed on the dash are used in connection with the high-tension system. The jump-spark can be used as an alternative system in case of emergency.

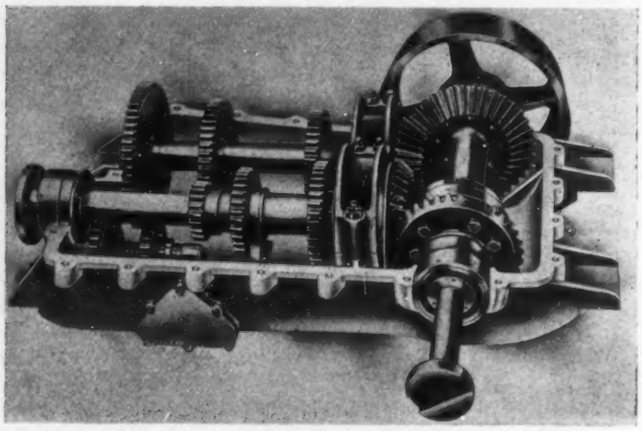
A gear-driven gear pump circulates the cooling water, the radiator being of the continuous-tube type, the tubes being ribbed.



CHASSIS OF AMERICAN MORS 24-32-HORSEPOWER CAR SHOWING ARRANGEMENT OF JOINTED JACKSHAFT.

A twelve-gallon water tank is placed at the rear of the car and has a steam outlet and a water overflow. A funnel under the footboard is provided for filling the tank.

Splash lubrication is employed. A transverse partition in the center of the crankcase prevents the oil from running to one end or the other on hills. A mechanical oiler, with plunger pump,

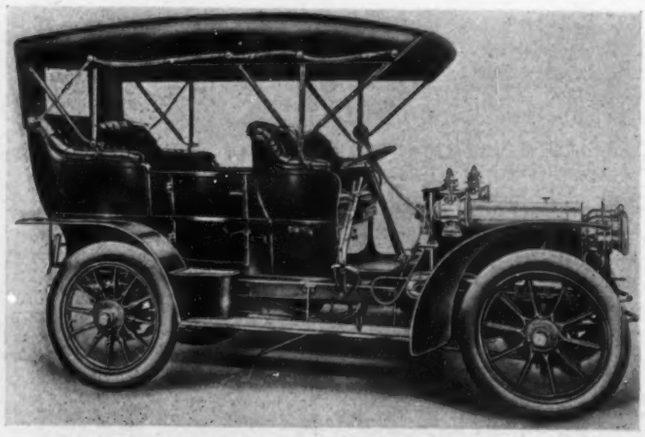


FOUR-SPEED SLIDING GEARS AND JOINTED JACKSHAFT.

has two feeds, one to the center of the inlet valve camshaft, the oil running over and lubricating the shaft and cams and then dropping into the crankcase, and the other to the camshaft gears. The leads are fitted with sight feeds. A hand pump is fitted on the reservoir for emergency use.

The frame is of pressed steel of the usual channel section, thoroughly braced and gusseted at the corners. There are four cross-members; the front one is of T-section and supports the radiator, the second and third are of channel section and are dropped to carry the change-speed gearcases, and the fourth, at the rear, is also of channel section. The front of the car is supported by two semi-elliptic springs 38 inches long and 2 inches wide, and the rear is carried on a three-spring platform system.

The clutch is a leather-faced cone; under the leather facing, in depressions cut in the metal of the cone, are pads of rubber, which act as springs to give gradual engagement. Thrust is taken by a ball bearing. The short propeller shaft between the clutch and the transmission gearcase has a universal joint of spherical type, at each end.

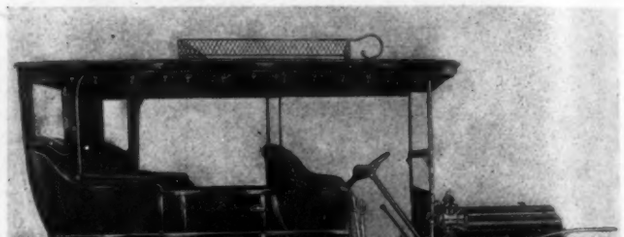


AMERICAN MORS 24-32-HORSEPOWER TOURING CAR.

Four forward speeds and one reverse are provided for by the sliding change-speed gears, the fourth or high speed being on the direct drive. The case is of the usual aluminum construction, split on the center line horizontally. A rearward extension incloses the bevel gears, differential and the inner ends of the countershaft. All the shafts in the gearcase are mounted on annular ball bearings. The differential is of the bevel gear type.

The countershaft does not extend unbroken from the differential to the sprockets, but each half contains a universal joint and the outer sections, carrying the sprockets, run in two ball bearings each, the bearings being secured to brackets riveted to the frame. Roller chains of 2 1-2 inch pitch and 3-4 inch wide drive to the sprockets on the rear wheels. The sprockets are bolted to the brake drums and the drums are bolted direct to the spokes of the wheels. The hub brakes are internal expanding rings, operated by the usual hand lever at the side of the car, and there is also a pedal-operated differential brake.

Controlling devices consist of levers and pedals of the usual type. The four forward speeds and reverse are controlled by a single hand lever, while a second hand lever applies the hub brakes. The left pedal releases the clutch, and this pedal has a connection with the throttle, closing the butterfly valve when the clutch is withdrawn and so preventing racing of the motor. The right pedal operates the band brake on the differential, and the accelerator pedal, close beside the brake pedal, acts on the throttle exactly as does the small hand lever on the top of the steering wheel; either may be used at will. The clutch mechanism interlocks with the emergency brake connections, so that when the hub brakes are applied the clutch is automatically withdrawn and at the same time the engine is throttled—all by a single



AMERICAN MORS DEMI-LIMOUSINE 24-32 HORSEPOWER CAR.

movement of the brake lever. For emergency use, there is a rear sprag that can be let down to keep the car from running backward down hill, the release being operated from the driver's seat. An ignition cut-out button is placed on the steering wheel, and there is also a short-circuiting plug on the dash. A thumb-latch under the radiator permits the throttle to be opened when cranking the engine.

Except that it is smaller, the 14-18-horsepower car is a duplicate of the 24-32-horsepower machine just described. The wheelbase is 103 inches and the wheels 34 by 4 inches. The motor has a bore of 3.42 inches and a stroke of 4.89 inches. Five passengers can be carried in the body, which is built on the same lines as the larger machine. This model will also be built as a runabout.

Several variations in construction characterize the 40-52-horsepower car. The motor is of course larger, having a bore of 4.92 inches and a stroke of 5.91 inches. Cylinders are cast in pairs with integral heads and water jackets and the crankcase is split horizontally in the plane of the crankshaft and the bearings are carried by the top half. Instead of sliding the cams to change the time of ignition, as in the smaller cars, the entire camshaft slides in its bearings. Lubricating oil is fed direct to the cylinders, and falls to the crankcase to be splashed.

The system of control is similar to that of the smaller models, except that it is supplemented by another pedal which actuates external band brakes on the rear wheel drums. It is thus possible, by pressure of one foot on the two adjacent pedals, to apply simultaneously the differential brake and rear wheel brakes.

VARIED SPORTS KEEPING AUTO CLUBS BUSY

Santa Clara County's New Club Outlines Policy.

SAN JOSÉ CAL., Sept. 27.—Good roads work and the establishment of good feeling between automobilists and other users of the highways will be the principal objects of the recently organized Santa Clara County Automobile Club. President Polhemus, outlining the club's policy in his opening address at the inaugural meeting of the Board of Directors, stated that club members would be expected to show the utmost consideration for other users of the highways, whether pedestrians or horse drivers, even to the extent of waiving their own rights for the sake of establishing the desired cordiality and obliterating the too prevalent dislike of horse drivers for automobiles. It is expected that good roads work will progress slowly at first, owing to the newness of the club; but that with increasing membership and funds vigorous work can be done later. One of the plans of the new club is the appointment of a committee to call upon the city council and the supervisors, asking them to join in the good roads movement. The Board of Directors consists of President Polhemus, Vice-President J. R. Chace, Secretary-Treasurer J. H. Faull, E. P. Lion, George H. Anderson, J. S. Williams, J. Henry, E. L. Peacock and F. Martin.

Clevelanders to Witness Vanderbilt Cup Race.

CLEVELAND, O., October 1.—Conforming to the usual custom, the Cleveland Automobile Club will have one or more private Pullman cars to transport members to Long Island to see the Vanderbilt Cup Race on October 6. These cars leave Cleveland October 4, at 5 o'clock in the afternoon, and arrive in New York the next morning. During the day the cars will be ferried to Long Island City and run to Westbury, there to be occupied on Friday night preceding the race.

The club's annual meeting will be held to-morrow evening, October 2, at which time four trustees will be elected to fill vacancies caused by expiration of terms of office.

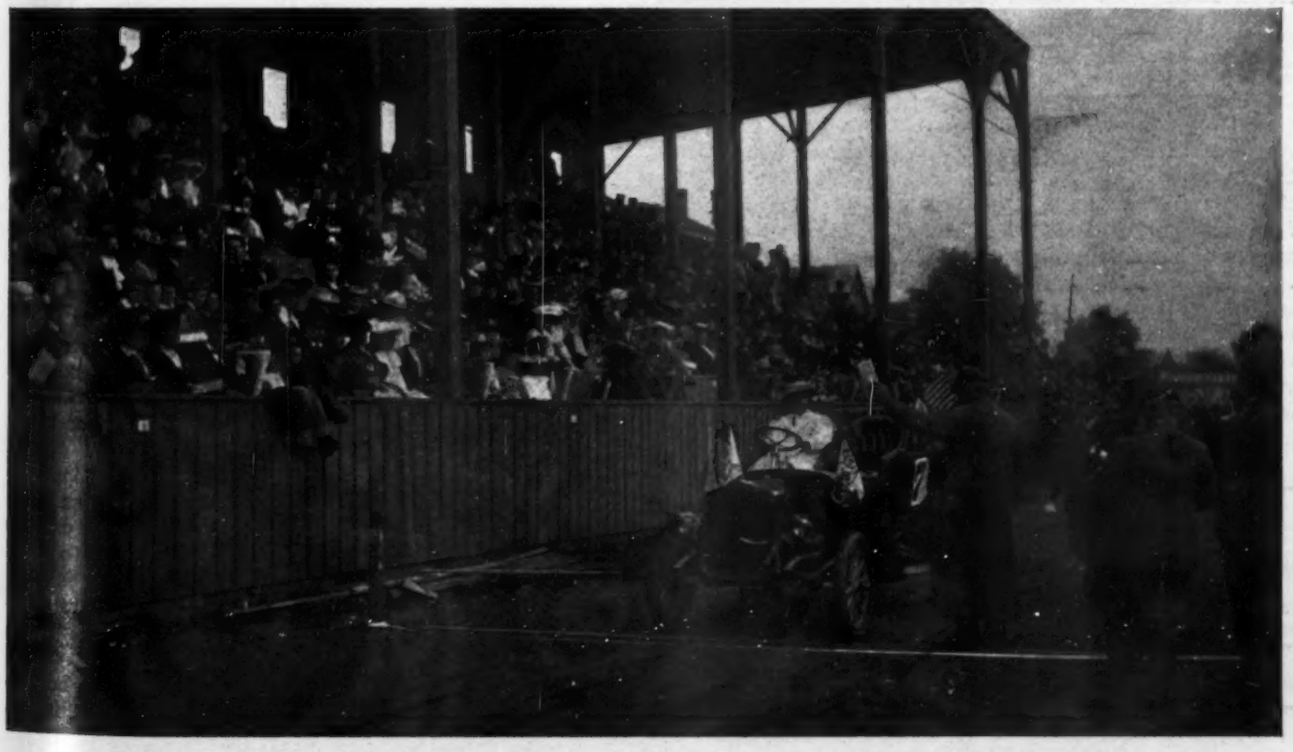
Work on New Hoosier Club House Again in Progress.

INDIANAPOLIS, IND., October 1.—Owing to a long delay in settling a hitch that arose concerning the lease for the ground on which the building was being erected, the construction of the clubhouse for the Indiana Motor Club was suspended pending the negotiations. Trouble did not brew until the foundations for the building had been laid. Now, however, everything has been satisfactorily arranged and members of the building committee state that the clubhouse will be ready for occupancy this winter. Of the 200 members of the club many are owners of motor boats, and the location of the new quarters, on a bend of the river, where there is a fine view of a long, straight stretch of water, will be particularly appreciated by the nautically inclined. In the basement there will be storage room for boats, lockers and other conveniences for the motor boating members. The main floor will contain the usual club rooms and offices, the second floor will be a large dancing hall, and the topmost feature will be a roof garden. The location is in Broad Ripple Park, adjoining the White City.

Worcester's Postponed Gymkhana Successfully Held.

WORCESTER, MASS., October 1.—The second annual gymkhana of the Worcester Auptomobile Club at Worcester oval Saturday afternoon, postponed from September 22 on account of heavy rains, was attended by about 1,500 spectators, many of whom came from out of town in their automobiles. The sports were preceded by a street parade which formed in front of the headquarters of the club on Front street and got under way, headed by a big automobile truck carrying B battery brass band, at 1 o'clock. The parade went through the principal street of the city. There were only a few of the twenty-five cars in line, decorated, that of President J. P. Coughlin's, arched and twined with green bunting and marigolds, receiving the cup for best decorated car.

The parade then headed for the oval. During the afternoon the women drivers were easily the stars of the sports. Miss C. E.



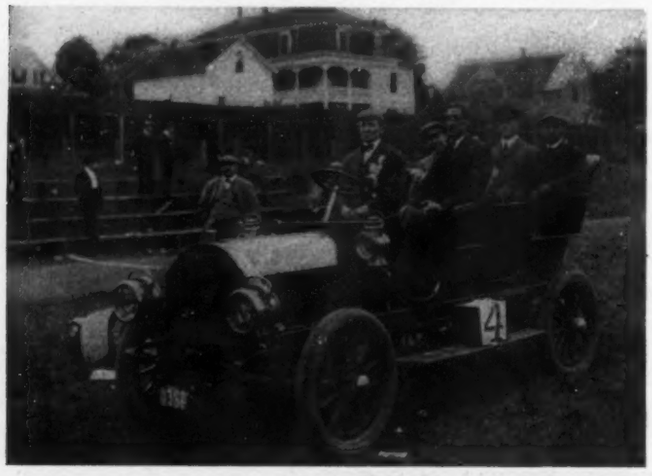
MISS EVA BRUNELL, WINNER OF FOUR PRIZES AT THE WORCESTER GYMKHANA, IN HER BUICK TOURING CAR.

Gardner, of Southboro, at the conclusion of the games had two firsts and one second to her credit, while Miss Eva Brunell, of Worcester, captured one first, two seconds and a third. She is only fifteen years old and driver of a Buick touring car.

The program was in charge of W. P. Mather, president of the Rhode Island Automobile Club as head judge, and J. W. Murphy, Worcester, as timer. It consisted of a series of events calculated to exhibit the ease and certainty with which automobiles may be managed by expert drivers—and others. The silver cup for the automobile station or factory scoring the most points was awarded to Miller and Stowe of the local garage. H. H. Hawkins, of Boston, made the best individual score, winning three firsts, three seconds and one third and capturing the cup.

Prizes for Roadmakers Offered by Toronto A. C.

TORONTO, ONT., October 1.—So successful has proven the scheme of the Toronto Automobile Club to award prizes for the improvement of the roads in this vicinity that it has been decided to extend it. An additional $200, raised by subscriptions from the members, will be offered in prizes to pathmasters and road commissioners. It was thought well to start a competition among them, as the work in connection with the original competition will



H. H. HAWKINS, OF BOSTON IN HIS GROUT CAR

Largest individual winner of prizes at the gymkhana of the Worcester Automobile Club: 3 firsts, 3 seconds and 1 third.

require considerable attention from them. The prizes are divided into two classes. In municipalities where the road commissioner has charge of all the roads in the municipality the club will offer three prizes, a first prize of $50, and two second prizes of $25 each for the road commissioner whose municipality shows the greatest amount of improvement in connection with the original competition. In municipalities where the work is in charge of pathmasters, each responsible for his own beat, the club will offer a first prize of $50 and two second prizes of $25 each for the pathmasters in the municipalities who enter their beats in the road competition and show the greatest improvement in the roads which are entered in the competition. The rules to govern the main competition have just been settled as follows:

The prizes shall consist of a first prize of $500, a second prize of $200, and a third prize of $100.

They will be awarded for the piece of roadway, a mile in length, on which the greatest improvement is made by July 1, 1907.

Parties entering shall designate the road so that inspection of the present condition can be made before work is commenced.

Merits entering into the contest shall be: (1) Proper drainage; (2) serviceable width; (3) finishing of ground; (4) hardness; (5) smoothness; (6) permanency of construction.

No first prize shall be given unless there are five entries; no second prize unless there are eight entries, and no third prize unless ten. No prizes shall be awarded unless the work is finished to a standard approved by A. W. Campbell, Commissioner of Highways for the Province of Ontario.

Nashville Automobile Club's Hill Climbing Contest.

NASHVILLE, TENN., September 24.—The weekly runs of the Nashville Automobile Club are proving a most popular feature of this aggressive organization. The club makes runs to nearby towns on Sunday afternoons, making the return run after dark. It is the intention of the club to establish a clubhouse near the city, and Nine Mile Hill, on the Harding road, has been selected as the site. This is one of the longest hills near the city, being a mile long, and it is reached by one of the most picturesque pikes in the county. On this pike is situated the historic Belle Mead, once the most noted stud and home of the race horse in the South, which has recently been purchased by officials of the Illinois Central Railroad and is now being subdivided into a residential park.

Recently the club held a hill-climbing contest up Nine Mile Hill which proved of special interest. Two loving cups were offered and there were two events, one for machines costing $1,500 and over and the other for machines costing a less amount. Duncan R. Dorris won both prizes, with a Dorris machine of the first class and a Ford of the second. The following is the order of finish and the times made:

Duncan R. Dorris, 30-h.p. Dorris, 1:24 2-5.
E. C. Andrews, 30-h.p. Marmon, 1.32.
E. E. Sweeney, 24-h.p. Stevens-Duryea, 1:32 2-5.
Duncan R. Dorris, 12-h.p. Ford (J. C. Symmes, owner), 1:34 3-5.
C. Coddington, 22-h.p. Buick, 1:40.
Joseph Lindauer, 30-h.p. Marmon, 1:47 2-5.
S. Gilliam, 30-h.p. St. Louis, 1:48 2-5.
Joseph Yowell, 22-h.p. Buick (Dr. William Bell, owner), 1:49 3-5.
J. O. Chester, 20-h.p. Clark, 1:55.
C. Hooney, 18-h.p. White, 1:58.
C. W. Caldwell, 12-h.p. Ford, 2:04 2-5.
John Smith, 8-h.p. Oldsmobile, 2:09 3-5.
Dr. J. A. Dale, 8-h.p. Ford, 2:56 1-5.
T. Linehan, 8-h.p. Oldsmobile, 3:55 2-5.
P. A. Shelton, Jr., 30-h.p. St. Louis (dropped out after starting).

A Case of Much Importance to Automobilists.

KANSAS CITY, September 29.—A case that will pretty thoroughly test the liability of motorists for runaways in the state of Missouri is to be appealed to the Supreme Court of the state, according to the present intention of E. A. Bennett, guardian of Charles R. Bennett, against whom the suit was brought. The younger Bennett is at present in the Philippines.

The suit should establish whether the contention of Bennett, which is sustained by counsel for the Kansas City Automobile Club, is to be upheld. According to this view, the Missouri law licenses the car and not the driver, and no action may be brought against a person driving a car duly licensed on the plea that the driver is not the holder of the license. It was on the view of the court that it is the driver who is licensed, and not the machine, that judgment was entered.

The history of the case is this: Charles R. Bennett was driving an Oldsmobile runabout on the streets of Butler, Mo., July 6, 1905. The car belonged to E. A. Bennett and Dr. E. G. Zey. While driving, the lad met J. L. Ghere, a farmer, on one of the streets. He approached the farmer very slowly and stopped some ninety feet before the latter came up. The stop was made at a street crossing and the boy turned clear out of the street and stopped on the cross street. Ghere came up with his horse apparently under control until he came to the cross street, when he turned down the cross street. The horse ran away and threw him out of the vehicle. His leg was broken.

Both the Bennetts and Dr. Zey were joined as defendants, but a demurrer as to the elder Bennett and Dr. Zey was sustained. E. A. Bennett was appointed the boy's guardian and the case was tried as against the lad. A change of venue was taken to Harrisonville, Mo., where the sentiment against motorists is rabid. This is the town, as will be remembered, which the Kansas City Automobile Club crossed from the route of its endurance run because of the hostility of officials and residents.

In his instructions to the jury the court held that the boy was operating the car in violation of the state law, as he had no license, and therefore no right to the highway. The license was issued to the elder Bennett and Dr. Zey. The jury found for

Ghere to the amount of $1,250. As the driver of the car, according to the evidence presented in court, used even more than ordinary care to avoid an accident, giving up the entire road to the horse, it seems unlikely that such a verdict, in the face of the common interpretation of the law regarding licenses, will stand. Automobile clubs in the state may decide to aid in fighting out the matter.

Southern Californians Demand Reform in Road Funds.

Los Angeles, Cal., September 26.—William M. Garland, president of the Automobile Club of Southern California, has issued a letter calling upon automobilists and advocates of good roads to meet in convention and decide upon a plan whereby suitable roads and fair laws can be secured. President Garland speaks in no uncertain terms; he had things to say and he said them. In the course of his statement he says:

"By a united effort the 3,000 automobilists in this end of the state can perform wonders in securing an honest disbursement of our public road appropriations. The time for action has come and we should meet in convention and plan our campaign. I have come to the conclusion that the disbursement of public funds, on the public highways, generally speaking, is no more or less than the purchasing of votes throughout the districts which are misrepresented by their supervisors and road overseers. If we ever expect good roads the money must be placed in the hands of competent roads commissioners. We must have men who know the science of road building and will give us highways which with a fair amount of care will be good roads 150 years from now. I believe the management of the public roads should be kept entirely out of politics. Instead of pleasing the district leaders by improving little roads which lead nowhere, the main highways should be given constant attention and put in the best of shape at all seasons of the year."

A. C. of Pittsburg Wants Chauffeurs Licensed.

Pittsburg, Pa., October 1.—Automobile owners and officials in this city have organized a movement which is gaining ground rapidly to have all chauffeurs pass a thorough examination before they can be licensed. This is the direct result of the large number of accidents that have occurred in Pittsburg lately, most of which have been due to careless or incompetent chauffeurs. Both Ordinance Officer Murray G. Livingstone, and Frank Ridgway, director of the Department of Public Safety, are heartily in favor of the scheme and are anxious that legislation shall be framed up and passed at the next session making examinations necessary. W. Linford Smith, vice-president of the Automobile Club of Pittsburg, and Hon. James Francis Burke, the club's attorney, are both behind the movement. At present anybody over eight years old can get a license to run an automobile and officials of the club are taking decided steps to see if some means cannot be devised by which examinations must be taken, at least for city driving, before the state gets around to legislate.

CLUB DOINGS IN GENERAL.

New York.—The second annual exhibition of the Aero Club of America will be held at the time of the automobile show of the Automobile Club of Americca, in Grand Central Palace, December 1-6, 1906. The exhibit promises to surpass that of last year in general interest and practical application, and will contain a full résumé of the achievements of the past year, as well as exhibits of the latest progress made in the art of aerial navigation.

Jacksonville, Fla.—The recent orphans' day celebration of the Jacksonville Automobile and Motor Club was a pronounced success. In addition to giving the orphans an outing the club also included the inmates of the Confederate Veterans' Home as its guests, and both youth and old age were represented in the festivities of the day. Riverside Park was the termination of the pilgrimage, and when the automobiles deposited their living freight at that popular resort, refreshments and entertainments a-plenty awaited them. The affair will be made an annual fixture.

San Francisco.—Thirteen of the thirty-one entries in the recent endurance run of the Automobile Club of California to Del Monte finished with perfect scores. They were as follows: A. Van Valin, Studebaker; Cuyler Lee, Cadillac; Dr. G. M. Freeman, Locomobile; E. M. Hecht, Stevens-Duryea; J. A. Landsberger, Franklin; Durrell White, Winton; Max Rosenfeld, Peerless; A. K. Rarig, National; C. L. Hovey, Pope-Toledo; C. C. Moore, Thomas; J. H. Baxter, Thomas; C. Lee, Cadillac; E. J. Bowes, Locomobile.

Chicago.—Automobilists have been considerably amused at the furore created by a resolution recently passed by the Austin Automobile Club, appointing a delegation to visit the park commission with a view of having horses barred from the boulevards on Sundays. The whole affair seems to bear the flavor of some practical jokers, and if they were looking for excitement they certainly found lots of it. Horsement were up in arms and liverymen held meetings denouncing the nerve of the automobilists. Everybody knows that it would be impossible to bar the horse from the boulevards, or any other road for that matter. The funny part of it was the way some of the Chicago papers took the bait, and discussed the matter editorially.

THE AUTOMOBILE CALENDAR.

AMERICAN.

Shows.

Dec. 1-8.....—Seventh Annual Automobile Show of the Automobile Club of America, Grand Central Palace, New York City, under the patronage of the American Motor Car Manufacturers' Association.

Jan. 12-19.....—Annual Automobile Show of the Association of Licensed Automobile Manufacturers, Madison Square Garden, New York City.

Feb. 2-9.....—Chicago Automobile Show, Coliseum and First Regiment Armory. S. A. Miles, manager, 7 E. 42d Street, New York City.

April 6-13.....—Montreal, Canada, Second International Automobile and Sportsman's Exhibition. R. M. Jaffray, manager, 309 W. Notre Dame Street.

March 9-16.....—Boston Automobile Show, Mechanics' Hall and Horticultural Hall, Boston Automobile Dealers' Association.

Tours.

Oct. 2-6.....—Endurance Run and Tour of the Binghamton (N. Y.) Automobile Club, to New York and the Vanderbilt Cup Race.

Oct. 6.....—Tacoma, Wash., Automobile Day of the Tacoma Automobile Club at Puyallup Valley Fair.

Oct. 20.....—Philadelphia, Pa., Cross Country Run of the Philadelphia Automobile Club.

Race Meets and Hill Climbs.

Oct. 6.....—Vanderbilt Cup Race, American Automobile Association.

Nov. 6.....—Newark, N. J., Weequahic Park, Waverley, Election Day Race Meet of the New Jersey Automobile and Motor Club.

Nov. 29.....—Riverside, Cal., Thanksgiving Day Hill Climb, Box Springs Grade Hill.

Jan. 22-26.....—Ormond-Daytona (Florida) International Race Meet, Florida East Coast Automobile Association.

FOREIGN.

Oct. 5-14.....—Leipzig (Germany) Exhibition, Krystall Palast.

Nov. 1.....—New Zealand International Exhibition opens at Christchurch.

Nov. 1-16.....—Berlin (Germany) Automobile Exhibition.

Nov. 15-24.....—London Olympia Motor Show.

Nov. 23-Dec. 1..—London Stanley Show, Agricultural Hall.

Dec. 7-23.....—Paris, Ninth Annual Salon d'Automobiles, Grand Palais.

Dec. 15.....—Calcutta, India, Exhibition of Automobiles, etc., Automobile Association of Bengal.

Race Meets, Hill-Climbs, etc.

Oct. 7.....—Chateau Thierry (France) Hill Climb.

Oct. 23.....—Gaillon (France) Hill Climb.

The Automobile

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Benefits of the Vanderbilt Cup Race in America. Thousands of columns of news matter about the Vanderbilt Cup race have been printed in the daily and weekly press and in the magazines; in fact, there is scarcely a publication of any sort whatever but what has referred in some manner to the great international struggle of October 6. That the attention of the whole country will be focused upon the thirty-mile course on Long Island is self-apparent, and the name of the winner will be heralded both here and abroad in type of the blackest kind.

While the value of racing is not unanimously agreed upon, the prominence of the forthcoming contest again will draw attention to the wonderful space-destroying possibilities of the motor-driven conveyance, which some day will have constructed for its exclusive use broad trunk line roads that will connect the various states and stretch from ocean to ocean. Of course there will be tributary roads where lesser speed will be required, but on the main highways, properly safeguarded, there will be opportunities for full employment of the time-saving qualities of the automobile. That it is absolutely unjustifiable—nay, even criminal—to drive at reckless speed over our average roads as now constructed is daily made evident, and punishment should be meted without hesitation to these regardless offenders.

But to obtain the true worth of the automobile, which worth is accentuated by these high-speed struggles, there must come the building of roads that will be for the sole occupation of the automobile, just as the steel lines are now confined and built for the steam locomotive and the trolley car. And this necessity of the future is not far distant, for the need of it is too plain to be disregarded much longer. The spirit of the century fairly breathes speed, and people will hurry, but it must be accomplished under conditions of safety to the one who travels leisurely as well as to the man who goes rapidly.

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Alcohol and Gasoline Considered Comparatively. Elsewhere in this issue, at the end of the third and last installment of an article on "Alcohol as a Fuel for Explosion Motors," by Thomas L. White, which has been running in our columns, a comparison of alcohol and gasoline will be found in tabular form. A brief inspection of the figures there given will reveal the fact that although the calorific value of alcohol is only about half that of gasoline, it by no means follows that a ratio of 2 to 1 must obtain between the selling prices of the two fuels to enable alcohol to compete on equal terms. Nature is full of compromises, and it has ordained that a mixture of alcohol and air shall be capable of very high compression, without ignition, with the result that the alcohol motor has a thermal brake-efficiency percentage, which is nearly half as great again as can be attained with the use of gasoline.

Translated into figures this means that, whereas with equal thermal efficiency in the motor, 17 gallons of alcohol would be necessary to do the work of 10 gallons of gasoline, as a matter of fact, 12.5 gallons is all that is necessary, always supposing that the alcohol is burnt under the best conditions with a high degree of compression. If the two fuels be burnt in the same motor, the thermal advantage of alcohol is not so great, and the corresponding quantities, to produce an equal result on the crankshaft, become 15 gallons of alcohol as against 10 gallons of gasoline. In practice, the actual equivalent number of gallons would lie somewhere between 15 and 12.5, and to insure economic equality the price of alcohol will have to be from a fifth to a third lower than that of gasoline.

In practical motoring it is always an object to get as much power as possible out of a given motor, and to this end it has been usual to add benzol to alcohol to increase its heating power. As a matter of fact, as is explained at length in the article to which we have referred, it is impossible to increase the output of a motor in this way. The volume of air a given cylinder can hold is only capable of supporting the combustion of a given amount of fuel, and if the calorific value of the fuel is greater, it works out in practice that the amount of that fuel which can be burnt up in the cylinder at each stroke is proportionately lessened, so that there is no gain in the total heat liberated, or, consequently, in the capacity of the motor. In fact, the low calorific value of alcohol is in no way a disadvantage if its price be right, except in one respect, viz.: that of bulk. A touring car running on this fuel will need a greater fuel storage capacity, but, as a set-off, alcohol is so safe that spaces about a car can be utilized to store it where no person would venture to put gasoline.

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The Latest English Effort on the Dust Problem. A six months' trial of an experiment that grapples with the dust problem has been tried by a county council in Breconshire, England. Commenting upon the success of the idea, reference is made to the fact that along a new stretch of road the grass is green as if newly watered, while along the old road the grass is whitened by the dust. It would appear that the solution is exceedingly simple, and it consists of using a binding material of a mortarlike character, which as it hardens tends to solidify the road material and thus diminish the dust. The inventor says that the idea came to him by noticing that where mortar had been mixed on the roadway the surface became as hard as a stone. "So it occurred to me," remarks the discoverer, "that the use of a special artificial binding would both lengthen the life of the road considerably and diminish the dust nuisance." Undoubtedly the English idea will be examined by our road makers, for every effort tending to meet the dust problem deserves careful attention and intelligent analysis.

A. C. A. COMMERCIAL VEHICLE TEST.

A four-days' motor wagon contest will be held by the Automobile Club of America from November 6 to 9 next, inclusive. It is to be open to all types of wagons and trucks for commercial purposes, and electric, gas and steam vehicles will compete in one class, the only requirement being that every machine must be capable of carrying a dead load of 50 per cent. of the total weight of the vehicle and its load with all supplies on board.

The contest is to be held in New York City, over the same routes as were selected for the commercial vehicle contest organized by the club in 1903. One of these routes is from the clubhouse at Fifth avenue and Fifty-eighth street north to Kingsbridge at Two Hundred and Thirtieth street by way of Central Park West, Amsterdam avenue and upper Broadway, returning by way of Sedgwick avenue, Jerome avenue, over Central Bridge, Seventh avenue and Fifth avenue. The other route is from the clubhouse south on Fifth avenue and Broadway to the Battery at the lower end of Manhattan island, returning by way of West street, Laight street, Canal street and Fifth avenue. The long route covers a distance of 20 miles and presents difficulties in the nature of hills; the shorter route is 10 miles long and will take the cars through the most congested traffic in the city.

Each vehicle will be required to travel 40 miles each day. On the first day the contestants will be sent over the routes with full loads and will make no stops. The second day they will carry full loads and make a specified number of stops. The third day they will carry no loads and make no stops. and on the last day they will carry no loads, but will make a certain number of stops. Observers appointed by the club will accompany all competing vehicles each day.

Awards are to be made on the basis of cost of operation per ton mile of paying load. The cost will include fuel and oil consumed, labor spent in making repairs and adjustments charged at the rate of 50 cents an hour, and all supplies and spare parts charged at retail prices.

The prize to be awarded the winner is a $500 trophy cup; certificates of performance will be awarded to the other competitors.

CHICAGO'S ONE-GALLON ECONOMY TEST.

CHICAGO, Oct. 1.—The joint committee representing the Chicago Motor Club and the Chicago Automobile Trades Association met on Saturday and decided to revise the plans for the economy test, which is to be held next month. The committee, which consists of Joseph W. Gunther, Walter L. Githens and John W. Hayden, have decided that instead of holding a one-gallon economy test with no given finishing point, that a definite course be mapped out and pick the winners from the quantity of gasoline used, figuring on a handicap basis, in which the weight of the cars will enter. This run will be held October 16, starting from the New Southern Hotel. The first car will be started at 10 o'clock in the morning and go over an eighty-mile circuit, passing through South Chicago, Hammond, Hessville, Highlands, Hobart, Wheeler, Spriggsboro to Valparaiso. This will be a distance of fifty-five miles. From here the course will turn west to Crown Point, Ind., nineteen miles away, where the finishing point will be.

BUFFALO'S AUTOMOBILE SHOW DATES NAMED.

The fifth annual Buffalo Automobile Show will be held at Convention Hall, that city, the week of February 18, 1907. The four previous shows were held the first week in March, but the week of February 18 being the only available one for next year that the hall can be obtained, the date has been changed.

GLIDDEN MEDALS WILL BE GIVEN OCT. 5.

The medals for the clean score men in the Glidden Tour will be distributed on Friday, October 5, by Charles J. Glidden, at the Waldorf-Astoria Hotel, New York City, to the drivers or their representatives who are to receive them. The medal is a massive silver one with very simple but beautiful lines. It contains on the obverse a reproduction of the Glidden Trophy and the words "Glidden Trophy." On the reverse the medal contains in addition to the name of the driver the following inscription: "Perfect score automobile Touring Contest for Glidden Trophy 1906 conducted by American Automobile Association." There are twelve of these medals. Mr. Glidden's offer included the twelve clean score men other than Percy Pierce, who does not receive one inasmuch as he

retains the custody of the trophy itself for another year, under the ruling of the commission.

Mr. Glidden selected the date and place for presenting the medals in order that they could reach most of the Glidden drivers at the same time. Nearly all of these will be in New York for the Vanderbilt Cup Race, and it will be convenient for them to be presented with the medals. Mr. Glidden will be present at the Vanderbilt race and will remain in New York City for a day or two afterward. About November 1 he is to start on his automobile trip through Mexico.

PENNSYLVANIA'S UNDECIDED LAW.

PHILADELPHIA, October 1.—On and after the 15th of the present month the automobilists of this city will take out a local license or take the consequences. Director of Public Safety Sheldon Potter was in office when, several months ago, the Pennsylvania Supreme Court decided that this city had a right to enact its own automobile law and issue local licenses. Potter is an automobilist himself, and, possibly realizing the injustice of compelling local autoists to take out both state and city licenses, did not overexert himself in seeing that the local law was rigidly enforced. The result was that hardly one in four of Philadelphia's automobilists has a city license and tag.

A week or two ago Potter and the Mayor had a falling out and the former resigned. His successor, Robert J. McKenty, had not been in office a week before his attention was called to the matter by the head of the Bureau of Steam Boiler Inspection, which issues the licenses. The result was the issuance of an order by Director McKenty that the law will be enforced to the letter, and giving all hands until the 15th to get under cover. During the next fortnight the Boiler Inspection Bureau officials expect to do a land office business.

MR. GROSSMAN QUITS CONTINENTAL COMPANY

Announcement was made early this week that Emil Grossman, for several years secretary and general manager and director of the Continental Caoutchouc Company, the American branch of the Continental Caoutchouc & Gutta-Percha Company, of Hanover, Germany, manufacturers of Continental tires, has by mutual agreement severed his connection with the company, to take effect October 6, 1906.

CONCERNING THOSE WHO WILL DRIVE.

(*Continued from page 424.*)

finish. Ran a splendid race in 1905 in the Auvergne Gordon-Bennett Circuit; was leading in the third lap when one of his wheels "ran away." Both driver and mechanic escaped uninjured. Came to America in 1904, qualified in the Vanderbilt Cup, and won all sympathies for his gentility and his masterly way of driving.

The very best success of his yet short career was this year in the La Sarthe Prix race, where he finished second after having been in hot pursuit of the leader Szisz on 1,200 kilometers during the two stages of the race. He is one of the favorites in the 1906 Vanderbilt Cup race. Albert Clément is very adroit, fast, and cold-blooded. Had adopted as a mechanic a short fellow of about his size, very sweet and quiet, and responding to the harmonious name of Venus. His assistant's real name, however, is Louis Alezy.

GEORGE HEATH (Panhard).—Born on Long Island, George Heath is the real type of the gentleman driver in the automobile game. Has been for seven years a faithful friend of the Panhard-Levassor factory, spending his time and money in buying and driving racing vehicles. Is known as a very careful and at the same time fast and adroit driver. Has competed in almost all the races. His great victory was the first place in the Vanderbilt Cup race in 1904. Many think that he will be a very dangerous enemy to the leader in the actual race.

HUBERT LE BLON (Thomas).—Born in Paris, March 21, 1874. Started in the automobile industry as one of the engineers of Leon Serpollet, the well known French builder of steam cars. In 1901 and 1902 won the hill climb in the Nice contest. Is one of the oldest and best drivers of France, being known as an excellent mechanic and a very calm, far-seeing, scientific driver. Has participated in almost all the great European automobile races since 1900. Madam Le Blon, his daring wife, has very often acted as a favorite mechanic to her husband. He has one of the best chances in the 1906 Vanderbilt Cup race as a member of the American team.

CAMILLE JENATZY (Mercedes).—Born in Brussels in 1871. He is not only a daredevil, but with his sterile beard, his piercing eyes, and that funny racing cap, that resembles very much the "cagoule" of the Spanish monks, Camille Jenatzy has really a fantastical, devilish, Mephistophelian appearance when he passes in the wind, half smiling at the wheel of his rapid Mercedes.

His complete biography would be too long for the telling. Has been everywhere, driving all sorts of cars, and lastly the great Mercedes. Is an excellent electrical engineer. In 1900, driving for the first time his famous electric freak car, La Jamais Contente, he broke all records, covering the kilometer in 32 seconds. Was a splendid winner at the third Gordon-Bennett Cup held in Ireland in 1903. One of the favorites in the present race.

LOUIS WAGNER (Darracq).—Born in Paris, November 2, 1881. Just as a racing stable lad can say he was raised among horses, Louis Wagner can claim the same particularity regarding his familiarity with the beasts of steel, for, when he ran away from school for the last time he steered directly for the Darracq's cycle factory. Has been about seven years now employed in the great works of Suresne, France, where the Darracq cars are built. Having commenced as a small hand, Wagner became a tester of voiturettes, and later drove in a few speed contests. Was in the army from 1900 to 1902 as a military chauffeur. His best races are the Ardennes in 1903, where he finished fourth; the Auvergne Gordon-Bennett Cup in 1905; the Belgium Ardennes the same year, and later the Vanderbilt Cup, where he was so sincerely admired for his great courage and skill. He and his two team companions, Hemery and De La Touloubre, were not successful in this year's racing events, although their machines are fast and built right. Stands a very good chance in the present race.

His mechanic is the now celebrated Demogeot, known to all Americans and people of the old world as the Speed King, a title which was given to him, with a crown, by a beautiful girl last year in Florida.

CHICAGO ENTERTAINS VISITING MAYORS.

CHICAGO, Oct. 1.—Visiting Mayors here were treated to an automobile ride by members of the Chicago Automobile Club last Wednesday afternoon and were driven to various points of interest about the city. The parks and boulevards were not neglected, and their "honors" had plenty of opportunity to see Chicago from a machine. In the first car were Mayor Rhett of Charleston, president of the League of American Municipalities; Mayor Dunne of Chicago, Secretary MacVicar of Des Moines and Mr. Brosseau. A cornet player rode with then, and there was also a musician in every tenth car.

CHAIRMAN HOOPER'S NEW ROUTE.

Robert P. Hooper, chairman of the Highways Committee of the American Automobile Association, has discovered a new route between New York and Philadelphia. Mr. Hooper gives the route, after leaving Philadelphia, as passing through Bustleton, Langhorn, Morrisville, Princeton, Kingston, Dayton, New Brunswick, Elizabeth and Newark to Jersey City, via the turnpike. This cuts out all the disagreeable ferry trips via Staten Island, and the tourist is spared the necessity of traversing the extremely bad Camden streets. Mr. Hooper believes this route to be far superior to any other frequented by automobilists.

THE CHICAGO PARTS SHOW.

CHICAGO, Sept. 29.—Numerous novelties proved to be a feature of the Automobile Parts Show which closed here tonight after a run of a week. Every firm represented had some article which caught the attention of the spectators. The First Regiment Armory, where the show was held, was a picture, the decorations being tasteful. Yellow and blue bunting covered the ceiling and walls, and the booths were finished in Flemish oak, trimmed with electric lights. The special nights proved to be one of the most attractive parts of the program. Tuesday was dealers' night, and every attention was given to visiting dealers and manufacturers on that occasion. Wednesday was devoted to the Chicago Automobile Club, and half of the receipts were turned over to the organization for the building fund. Thursday the Austin Automobile Club was honored, and Friday the Mayors visiting the city were entertained. The closing night was devoted to the chauffeurs, who turned out in force to try for the prize offered for the man who was voted the most popular.

PLOUGHING A FACTORY ROADWAY.

Ploughing is not necessarily a part of the process of raising crops; neither is it absolutely essential that the power before the plough should be "man's best friend." The accompanying illustration shows an instance that proves this. The Aerocar Company, of Detroit, found it necessary to plough up a hard-packed cinder roadway to lower its surface, and the suggestion was made that an Aerocar of 24 horsepower be hitched to the plough instead of a team of horses. With a good many misgivings as to the practicability of the scheme, a "tester"—that is, a car with a skeleton seat that is out for testing purposes—was backed in and harnessed up to the implement of husbandry. The motor was started and the clutch let in. With a steady pull, the car sank the point of the plough into the hard road and proceeded to haul it along, turning up as neat a furrow as any team of horses could do. The experiment was a decided success, and the job was finished the way it was begun.

PLOUGHING ROADWAY WITH A 24-HORSEPOWER AEROCAR.

MOUNT VENTOUX HILL CLIMB.

AVIGNON, Sept. 16.—The twenty-one kilometers climb up the steep slopes of Mont Ventoux brought very few record runs on the part of the tourist class, and general disappointment in the racing section. Starting from the village of Bedoin at the foot of the mountain, the road presents a 6 per cent. gradient, quickly changes to 8, and for ten miles gives a 10 and 11 per cent. gradient, with short distances as steep as 13. Over the whole course there are sharp curves bordered by precipices, on which the skill of the driver and the strength of the car are put to the test. The exceptionally dry season had added difficulties in the shape of a bad road surface covered with several inches of dust, and the gale of wind which was blowing on the day of the race made matters still worse.

On Saturday, the opening day, tourist machines attempted the climb, the fastest time being done by Giuppone on a Griffon motorcycle in 26 minutes 58 seconds, beating the record climb established by Ruamps, also on a Griffon, of 27 minutes 9 1-5 seconds. Champoiseau, on an Aleyon, came second in 30 minutes 6 3-5 seconds, there being nothing wrong with the machine, but the driver was insufficiently acquainted with the road and had two or three falls. Cissac, who captured third place on a Griffon, found his spark lever had worked loose at the start, and for 33 minutes 12 1-5 seconds had to hold it with one hand and steer with the other, giving a striking exhibition of pluck and determination.

The Bordeaux firm of Motobloc captured first place in the $1,800 to $2,800 chassis class, Ladougne reaching the plateau in 32 minutes 25 seconds, thus easily breaking the Darracq record of 50 minutes 15 2-5 seconds and furnishing an average of about 25 miles an hour, and this with a fully equipped touring body ready for the road. Radia came second, and Mieursel captured third place.

An $800 Aleyon runabout driven by Fournier reached the top in 1 hour 19 minutes 53 3-5 seconds, whilst a Griffon tricar and a S. A. F. tricar covered the same distance in 1 hour 8 seconds and 1 hour 6 minutes 56 seconds respectively, all three little machines receiving a hearty reception at the end of their gallant struggle.

The second day should have brought out the big flyers, but only Rougier, on a Lorraine Dietrich, and Collomb, on a Rochet-Schneider, put in an appearance. The new six-cylinder Bayard-Clement which had been half expected did not arrive. Rougier got away first, but was hard pressed by the Rochet-Schneider, and in his eagerness took the Saint Estèphne turn too quickly and came to grief, the machine being unable to continue, but the driver was unhurt. Collomb climbed up alone with a slipping clutch and was clocked for 24 minutes 40 seconds. Cagno's (Fiat) record of 19 minutes 30 seconds remained untouched, none of the contestants coming anywhere near it.

Champoiseau (Aleyon) was at the head of the racing motorcycle section in 26 minutes 34 3-5 seconds, but failed to lower Lamberjack's record of last year on a Griffon. Giuppon, on a Griffon, was a close second in 27 minutes 10 4-5 seconds. Prévot, on a René Gillet, came third, registering 30 minutes 34 3-5 seconds, despite two falls owing to the bad state of the hill surface. Cissac, on an Aleyon, had the fastest time of the lot, but was disqualified for having been pushed on one of the bad turns.

In the tourist class, $4,000 chassis, a Rochet-Schneider was first in 25 minutes 15 seconds, without lowering last year's record established by La Buire. Gareet, who steered a shaft-driven Bayard-Clement too highly geared for the hill, was second in 25 minutes 48 3-5 seconds.

In the $2,800 to $4,000 chassis class, Mottard, on a La Buire, broke last year's record by nearly 7 minutes, his time being 25 minutes 52 seconds. Fabre, on a Berliet, was a close second, and Bec, on a Martini, a poor third.

THE TARGA FLORIO IN 1907.

PARIS, September 20.—The Chevalier Florio, during a visit to Paris this week, has declared that the Targa Florio will be run next year on the Island of Sicily without the aid of government troops. As is well known, the Italian racing program has had to be almost entirely abandoned this year, owing to the refusal of the military authorities to give help. Recently a voiturette contest was held at Palermo, and passed off so successfully without the aid of troops that it has been decided to hold the Targa Florio under similar conditions next year. The Prefect of Palermo will grant 500 men, carbineers, gendarmes and police, to help at the grandstand, but the rest of the circuit will be left unguarded. The date of the Targa will be fixed at the calendar congress in Paris next December. The prize list will consist of $3,000 for the first, $1,600 second, $1,400 third, $400 fourth. An entrance fee of $20 per car has been fixed, half of which will be returned to every driver starting in the race, and the entire sum to all who cover the 450 kilometers in twelve hours. All competing cars, with three men for each, will be shipped, free of cost, from Marseilles, Genoa, or Naples to Palermo, and returned to the same ports after the race.

It is probable that a limit of 120 or 130 mm. bore will be imposed with a proportionate weight limit, and that two bucket seats will be demanded as body work.

THE MERCEDES AND THE RACING.

PARIS, Sept. 21.—Reporting interviews with M. Jellineck Mercedes on the abstention of the Mercedes firm from furtfier road races, certain Vienna and Berlin automobile journals have declared that M. Charley had no authority for declaring that racing would or would not be indulged in, but that a decision rested with the Cannstatt firm. Mr. Charley's explanation is that for some time past he has been given full power with regard to racing in the countries for which he is general agent, and has borne the entire expense. Thus in France, America, England and Italy it is certain that Mercedes machines will not officially be entered in speed contests. In Germany and Austria the parent firm would alone decide what should be done; but in view of the fact that he had frequently been advised from headquarters to stop racing, M. Charley did not consider that the Mercedes firm would undertake racing on its own account. In future, whatever Mercedes machines compete in speed contests, it will be on the responsibility and at the entire cost of their owners.

DISMOUNTABLE BODY WORK.

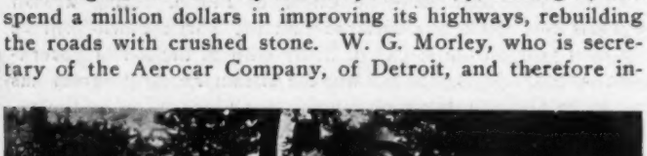
PARIS, September 20.—Objection having been made that automobile bodies are difficult, sometimes impossible, to dismount without the aid of appliances, M. Auscher, of the well-known firm of Rothschild, has replied that for a long time they have been studying this question and expect next season to place on the market only automobile bodies which can be dismounted from the chassis with the minimum of labor. For some time they have only employed mechanical bolts for attaching the body to the chassis and have made the mud guards quite independent of the body work, but the new model will show still further improvements and will make it possible to dismount a body work without any interference with the mechanical organs and place in position another one in the shortest possible time.

HON. C. S. ROLLS WINS TOURIST TROPHY.

DOUGLAS, ISLE OF MAN, Sept. 27.—The second annual automobile race for the Tourist trophy was run to-day. The course was one of four laps, the length being 161 miles 240 yards, for which 61 1-2 gallons of petrol was allowed. There were twenty-nine starters. The winner was the Hon. C. S. Rolls, who drove a Rolls-Royce machine of 20-horsepower. His time was 4 hours 6 minutes.

IMPROVING ROADS ABOUT DETROIT.

During the next five years Wayne County, Michigan, will spend a million dollars in improving its highways, rebuilding the roads with crushed stone. W. G. Morley, who is secretary of the Aerocar Company, of Detroit, and therefore interested in good roads from the point of view of an automobilist, in speaking of this road improvement movement, said:



MICHIGAN'S ACTIVE HIGHWAR COMMISSIONER IN AN AEROCAR.

Horatio S. Earle, State Highway Commissioner of Michigan, with F. J. Campbell, publicity manager of the Aerocar Company, on the Boulevard in a touring car.

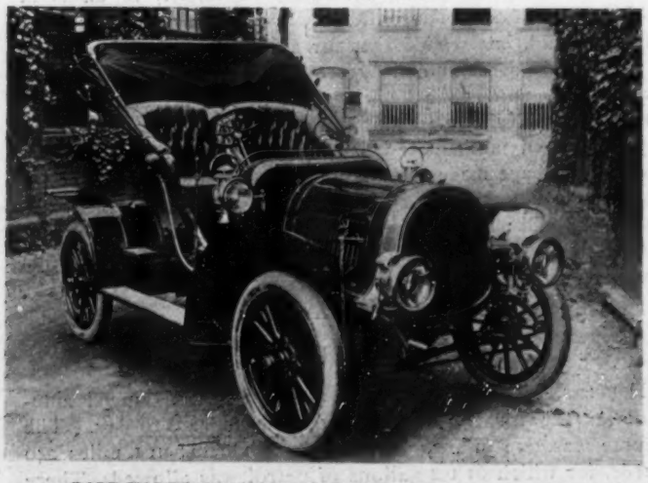
"Out of the total $1,000,000 the state will be called upon to pay about $175,000—the $1,000 per mile which is given toward the first cost of construction. That will leave $825,000 for Wayne county. Of this amount nearly 75 per cent. will come from the city of Detroit and will be spent wholly outside of the city limits. In other words, the rural residents will have to pay about $200,000 and will receive $1,000,000 worth of improvements directly in front of their property and in their community."

TIRE NEWS FROM TIREVILLE.

AKRON, O., October 1.—Plans are now under way, according to the best information obtainable at present, for the consolidation of the Panama Crude Rubber Company and the Independent Tire and Rubber Company, both comparatively new companies. The Panama Crude Rubber Company was incorporated early in the summer with a nominal capital, which was later increased to $150,000. This company was organized, it is said, for the purpose of operating large rubber plantations in Mexico and Central America. A few weeks ago the Independent Tire and Rubber Company was incorporated, and the plan is said to be for this company to use the raw material supplied by the Panama Crude Rubber Company for the manufacture of rubber tires.

The incorporators of both companies were George G. Allen, H. E. Andress, Frank H. Waters, E. A. Oviatt and F. E. Whittemore, all attorneys closely identified with the rubber business except Mr. Oviatt. It is said that the plans of the new companies go farther than contemplated at first, and include a merging of some of the largest plants in this city outside of the Goodrich company. The latter is said to have large rubber plantations in South America which will in a few years develop large outputs of rubber, and which will make the company more able than ever before to combat its competitors.

It is announced that the Punctureproof Tire Company of Cleveland will erect a large factory in this city next year and will manufacture a punctureless tire invented by Godfrey Knoedler, formerly of Akron. The tire is now being manufactured by the Stein Double-Cushioned Tire Company. Mr. Knoedler devised this tire after severing his connection with the Whitman & Barnes Company of this city. The Punctureproof Tire Company was incorporated a month ago with $100,000 capital stock, and Mr. Knoedler is to be the manager.



POPE-HARTFORD MODEL F EQUIPPED AS RUNABOUT.

An attractive and useful machine, with leather top, which has just been sent to Mexico by the Pope Manufacturing Company.

THE FORD BRANCH MANAGERS AT DETROIT.

FORD SELLING FORCE VISIT FACTORY.

Business was not neglected, but it did not offer any very serious obstacles to pleasure during the visit of the Ford branch managers to Detroit, where they were the guests of James Couzens, secretary-treasurer of the Ford Motor Company. While business sessions were held each morning with a view to deciding on plans and policy for the coming year, there were so few changes made in existing plans that the exertion did not seriously affect the health of any of the visitors. The Ford company placed one of the four-cylinder runabouts of $500 fame at the disposal of each agent, and also there were three of the big touring cars for carrying parties. Dinners, entertainments and sight-seeing trips kept the agents busy, and an inspection of the Ford factories was not the least of the pleasures of the week.

Among those who spent the week at Detroit were: Gaston Plaintif, New York; Charles E. Fay, Boston; F. C. Van Derhoff, Philadelphia; Thomas Hay, Chicago; Louis C. Block, Buffalo; Charles C. Meade, Kansas City, and Harry L. Cunningham, Cleveland.

METZGER'S FOREIGN DEDUCTION.

DETROIT, MICH., October 1.—That the importation of foreign-made automobiles into the United States has reached its limit, and that from this time on there will be a steady decrease in the volume of business of this nature is the opinion of William E. Metzger, general sales manager of the Cadillac Motor Car Company, Detroit.

Mr. Metzger recently returned from a European trip in the interests of his company, and his conclusions regarding the decline in this country of foreign cars are based on personal observation and the opinions of those with whom he discussed the subject while abroad. Several reasons are assigned for the predicated falling off, chief among which is the rapid depreciation which foreign cars undergo on this side of the water.

"The American car is better fitted for use in this country and is far superior to foreign-built cars in many ways," said Mr. Metzger, discussing the outlook a few days since. "In the first place our product is more desirable, because all the parts of a machine are interchangeable. They are produced in larger quantities by each manufacturer, and any trouble through wear and tear or accident can easily be overcome. On the other hand, the foreign manufacturer depends largely upon inadequate machinery and hand labor, which makes interchangeability more a matter of good luck than design and produces less satisfactory results as a whole.

"Foreign manufacturers are beginning to realize the disadvantages under which they labor, as is shown by the fact that they are installing American machinery as rapidly as possible in many of the larger European factories, having become convinced that this is their only salvation, not only as regards American trade, but in retaining their home markets. American cars are daily gaining favor abroad, and I predict that the volume of business of this nature will be far heavier during the coming season than ever before.

"Foreign manufacturers cannot compete with us, in spite of lower wages and other conditions usually regarded as favorable. This is due to the fact that where a foreign concern produces a hundred machines an American factory will turn out a thousand, this great volume of business giving Americans an advantage that can be overcome only by the adoption of similar tactics.

"Every European country offers an inviting field for American automobiles. Even in Russia and Scandinavia there is a strong demand for medium-priced cars, the prestige enjoyed by American machines giving them a marked advantage in devolving this comparatively new territory."

In proof of this assertion regarding the demand abroad for American cars, Mr. Metzger points out that the Cadillac Motor Car Company expects to export nearly if not quite 1,000 machines during the coming season, these being produced now because of the unprecedented early demand.

POPE COMPANY WINS IN STRIKE.

INDIANAPOLIS, IND., October 1.—Judge Albert B. Anderson, of the United States Circuit Court, last week rendered a decision in favor of the Pope Motor Car Company against the 370 striking machinists, many of whom are members of White River Lodge No. 11, I. A. of M.

Several weeks ago a permanent injunction, prohibiting strikers from picketing the Pope-Waverly plant, was issued and the decision rendered last week makes this injunction permanent. The backbone of the strike is broken, as the only influence felt from it has been the assaults on employees taking places of the strikers. Judge Anderson again cautioned the strikers against interfering in any way with the Pope company's interests or from trying to induce employees to leave their employment. The strikers are held for the costs of the case, which will amount to a large sum.

RAY OWEN ALSO TO SELL PREMIERS.

INDIANAPOLIS, IND., October 1.—R. M. Owen & Co., New York City agents for the Premier, have placed an order for 250 Premier 1907 models, to be delivered as fast as their construction will permit. As a result the Premier factory is preparing to build several new factory buildings and a large force of men will be employed. The order is the largest of its kind ever placed with an Indianapolis factory and will aggregate about $600,000.

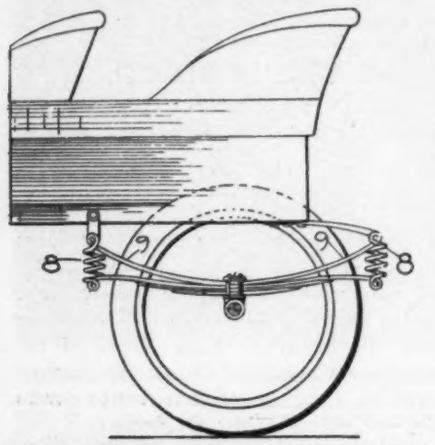
SAN FRANCISCO EMERGING FROM ITS RUINS—NEW LOCOMOBILE GARAGE IN THE CENTER OF THE PICTURE.

Patents

Vehicle Spring.

No. 831,276.—S. Furmidge, of St. Louis, Mo.

This is a special application of the well-known supplementary spiral spring. The master leaf *9* of the spring is arranged as



FURMIDGE'S COMPOUND AUTOMOBILE SPRING

usual, but the other leaves are bent downward and supplementary spiral springs are interposed in compression between the ends of the longest leaf and the spring eye bolts or shackles. The master leaf prevents sidewise play of the axle and the other leaves are depended on mainly for carrying the ordinary vertical load.

Non-slipping Tire.

No. 830,467.—M. Vivian, of Chiswick, London, England.

This is a tire composed of alternate sections of different degrees of hardness or flexibility, which sections are composed of any suitable rubber compound and preferably formed to run diagonally. The sections are vulcanized together.

Cushion Wheel.

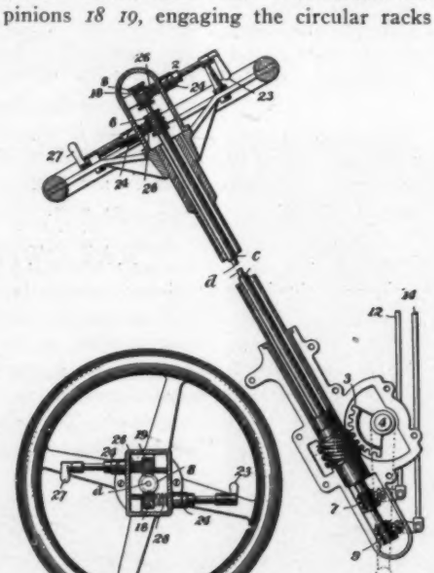
No. 831,384.—C. T. Schoen, of Maylan, Pa.

This is a pressed-steel wheel, using a solid rubber tire and having a special form of rubber cushion between the spokes and the hub. The spokes are pressed in one piece out of sheet steel and are embossed for stiffness substantially as shown. They are bolted to an outer hub *10*, which encloses the rubber cushion and tightening means for compressing the rubber. The cushion takes the form of a series of rubber rings *23*, which are flanged at their inner circumferences so that the rings are otherwise separated by air spaces, permitting their compression under radial loads. The rings are compressed by grooved wedges *26*, which in the drawing are four in number. These wedges carry tension wedges *30*, which are drawn up by the studs and nuts *31*. Each of these tension wedges has on its outer face a tongue *32*, which runs in a groove in the outer hub *10*. Thus the inner hub *19*, which may contain any sort of a plain or anti-friction bearing desired, is permitted to have some radial play with respect to the outer hub by the compression of the rubber rings. The details of construction are shown in the enlarged fragmentary sketch.

Control Mechanism on Steering Wheel.

No. 829,402.—R. Huff, of Detroit, Mich.

The control members for the spark and throttle consist in the thumb levers *23 27*, mounted on short shafts carried by the spokes of the steering wheel. To prevent these levers from moving by accident, they are held by the ratchets *24 24* and springs *26 26*. At the inner ends of the shafts are pinions *18 19*, engaging the circular racks



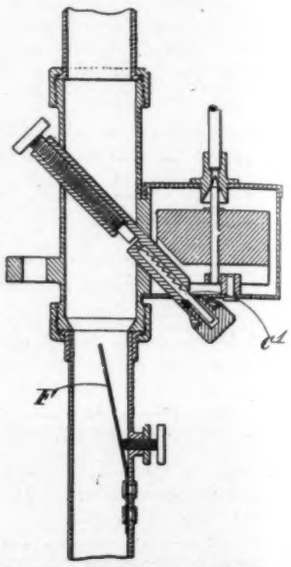
HUFF'S CONTROL MECHANISM.

8 and *6*, of which the former is fixed to the stem *d* and the latter to sleeve *c*, connected respectively to circular racks *9* and *7* below. These act on the links *14* and *12* through the pinions seen in the illustration.

Carbureter.

No. 831,547.—J. B. Dunlop and J. B. Dunlop, Jr., of Dublin, Ireland.

In this carbureter the flow of gasoline through the spray nozzle is automatically retarded, as the suction increases by means of the serrated wire *C'*, on which the teeth are so cut as to create minute eddies in the gasoline flow. As the velocity of the flow



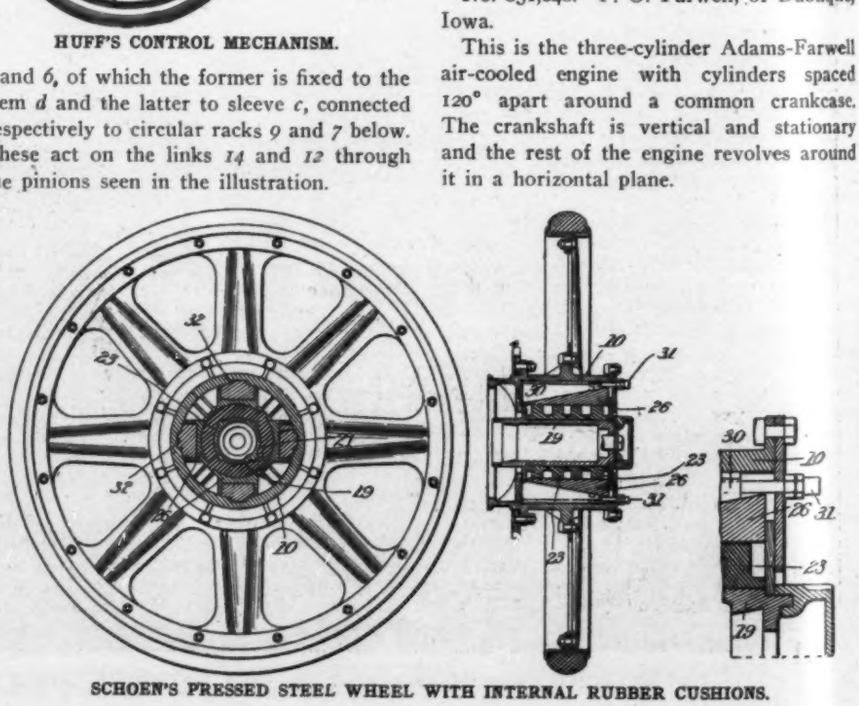
DUNLOP'S AUTOMATIC CARBURETER.

increases, the strength of these eddies and their retarding effect on the flow will also increase. In case a further automatic control is desired, it is supplied by the adjustable spring plate *F*, which yields to the flow of air according to the intensity of the suction caused by the engine piston.

Gas Engine.

No. 831,048.—F. O. Farwell, of Dubuque, Iowa.

This is the three-cylinder Adams-Farwell air-cooled engine with cylinders spaced 120° apart around a common crankcase. The crankshaft is vertical and stationary and the rest of the engine revolves around it in a horizontal plane.



SCHOEN'S PRESSED STEEL WHEEL WITH INTERNAL RUBBER CUSHIONS.

NEWS AND TRADE MISCELLANY.

Menasha, Wis., is to have an automobile factory, property on which to erect a factory having been purchased by business men of Menasha and Kaukauna.

A two-story building is to be erected at 1233 Michigan avenue, Chicago, for the Wayne Automobile Company, at a cost of $15,000. The company has taken a five-year lease on the property.

A tire repair shop, equipped for all kinds of tire work, has been opened at 2210 Farnam avenue, Omaha, Neb., by Herbert Wheelock and Floyd Flynn, both men of experience in the automobile business.

A foreign engineer and designer of automobiles, while visiting the factory of the Electric Vehicle Company, of Hartford, Conn., expressed his belief that the Columbia electric machines were superior to anything of the kind produced in France.

A handsome building is to be erected at 1615-17 Michigan avenue, Chicago, for the sale of the Packard cars, the Chicago Motor Car Company having leased the premises for a term of ten years. It is hoped to have the place ready for occupancy early in December.

The general offices of the Kansas City Motor Car Company have been moved from Kansas City, Mo., to Sheffield, where the factory is located. The Kansas City cars will be handled by Christie & DeCamp as sales agents, with offices at 310 West Ninth street, Kansas City.

Dr. F. H. Blackman, of Geneva, Ill., agreed to purchase two Moline cars on condition that the $1,000 Moline would climb the steepest hills around Geneva with four passengers up. The doctor bought the machines. C. P. Warner & Co., the Chicago agents for the car, made the sale.

Speed indicators for automobiles will be manufactured in Minneapolis by the Oliver Instrument Company, a recently incorporated concern with a capital stock of $20,000. F. C. Oliver, one of the incorporators, is the inventor of the instrument. Harry Pence and W. R. Gray are the other incorporators.

The makers of the Kilgore pneumatic shock eliminators state that thirty-five of their customers have taken European automobile tours varying from 2,000 to 10,000 miles during this season. They have one customer who has covered since last March more than 18,000 miles on American roads without one broken spring.

The Autocar Company, of Ardmore, Pa., has its preparations for the manufacture of 1907 models well advanced. In the shops are a number of limousines for fall and winter delivery. The manufacturers state that while roomy and comfortable, these cars are exceedingly handy for use in the congested streets of a city.

The George J. Scott Motor Company recently opened its new garage and salesroom at 1720-1722 Broadway, New York. The building is a new one, fireproof throughout, three stories high. The main floor is used as a sales and show room for the Glide car, while on the upper floors are repair shops and storage rooms.

The Texas Automobile Company, of San Antonio, Texas, has purchased the automobile business formerly conducted by G. W. Hawkins, of Houston, Texas. Ivan F. Vick and Vivian Vick are the men interested in the new concern. There will be a branch house at San Antonio which will be in charge of Vivian Vick, Ivan Vick taking charge of the Houston house.

For over 30 years the firm of Parker, Stearns & Co., 228-229 South street, New York City, has been manufacturing rubber goods, and it has just paced on the market, after the most exhaustive tests in practical use, an inner tube for automobile tires which possesses remarkable strength. The new tube is known as the Alpha, and is made of pure seamless rubber in all the required sizes.

A beautifully printed booklet has just been issued by the Pope Manufacturing Company, of Hartford, Conn., entitled "With the Lucky Thirteen," which illustrates and describes the Glidden tour of 1906, and the part the cars manufactured by the Pope plants took in it. The story of the tour day by day is interestingly told, and the book as a whole is well conceived and artistically produced.

Truffault-Hartford shock absorbers were fitted to the three leading cars in the recent Vanderbilt Cup Elimination Trial. Joe Tracy, the winner, had his 90-horsepower Locomobile equipped with them, they being a part of the regular Locomobile equipment, and the Thomas car, driven by Le Blon, which finished second, had Hartfords on, as did the Haynes car, driven by Harding, which finished third.

During last week the contract was again let for the tire equipment of the Cadillac Motor Car Company, Detroit, Mich. Every Cadillac car for 1907 will be equipped with the Hartford universal rim, taking either Dunlop or clincher type tires, which will comprise its exclusive equipment. This is the third consecutive year that this big mid-western factory has contracted for its pneumatic tires through these same channels.

Officers were elected at the annual meeting of the Electric Vehicle Company, of Hartford, held at Jersey City recently. The result was the continuation of the old officers, as follows: President, M. J. Budlong; treasurer, W. G. Henderson; secretary, H. W. Kyte; directors, M. J. Budlong, F. L. Kellogg, H. H. Vreeland, H. W. Kyte, W. G. Henderson, Albert Taylor, Grant B. Schley, Jr., M. Garvin, 2d, and W. O. Knudsen.

Having purchased the plant and leased the building formerly occupied by the Duluth Electrical & Construction Company, of Duluth, Minn., the Richardson Electric Company will continue its own electrical manufacturing business there and will, in addition, take over the automobile business of the Duluth Electrical & Construction Company. The Richardson company will also sell, store and repair automobiles at its garage.

An interesting fact in connection with the big Pope-Toledo racing car that took such a prominent part in the elimination trial for the Vanderbilt Cup race is that the clutch is fitted with the cork inserts of the National Brake & Clutch Company, of 16 State street, Boston, Mass. These consist of pieces of cork inserted in cavities in the clutch face and projecting slightly; they have the effect of keeping the faces clean as well as of giving a smooth engagement and a firm grip when the clutch is fully engaged.

The Healy Leather Tire Company, 88-90 Gold street, New York City, has established a branch at 1906 Broadway, to facilitate the proper handling of its increasing business in the upper end of the city. To expedite delivery of goods in the metropolitan district, and insure rapid collection and delivery of repair work, the Healy company has placed into service a 10-horsepower Cadillac delivery wagon, equipped with Healy leather tires, which during the winter season will present an effective demonstration of the adaptability of the tire to slippery pavements.

Dr. C. P. Pinckard, of Chicago, is the owner of an Adams-Farwell touring car in which he recently made a run from that city to Dubuque, Ia. The actual running time was 11 hours and 30 minutes, the total time being two hours more, which was spent in stops for meals and supplies of gasoline. The distance is a little over 200 miles. A few weeks ago Walter Nordhoff, accompanied by his son and Ray Farwell, drove an Adams-Farwell touring car from Dubuque to Rhode Island. They were two weeks on the road, averaging 100 miles every day, over a distance of 1,500 miles.

Last week Archie McLachlan, of Cleveland, took one of the new 1907 Royal Tourist cars fresh from the assembling department of the factory, and without preliminary trial loaded it with a party of friends and whisked it over into Canada, making Hamilton, Ont., nearly 300 miles from Cleveland, on the first day. It was Mr. McLachlan's intention to carefully watch the new Royal ignition system, but he forgot all about the working of the new '07 features of the car, and turned what was to be a trial trip into one of pleasure. A number of Canadian cities and towns were visited during the ten days spent on the road.

The Diamond Rubber Company, whose tires are used on all the American Vanderbilt Cup cars, offers a prize of $2,500 to the American driver who can finish first in the Vanderbilt Cup race; $1,250 to the American who finishes second; $600 to the third, and $400 to the fourth. The company expresses satisfaction in the work of the Diamond tires in the Elimination Trial and in the practice runs of the American cars. For the Vanderbilt Cup race there will be three more tire stations than there were during the trial, making a total of 11 stations. These will be manned by 65 tire experts, and at each station there will be a special officer to keep back the crowds of spectators, who got very much in the way during the elimination race.

Hipp & Hall, successors to Hipp, Reitz & Hall Auto Company, of Cleveland, O., have dissolved partnership. A. W. Hall will continue in the automobile business, and will open a new garage and general repair shop during the early part of the present month, in connection with his two brothers, T. B. and V. R. Hall, under the name of the Hall Brothers Automobile and Machine Company. A full line of machinery is being put in, and in a separate department a friction drive delivery wagon, with double chain to rear wheels, will be manufactured. The new wagon is especially designed with a view to simplicity and carrying capacity, being suitable for laundry work and bulky loads of that character, with a capacity of 1,500 pounds.

ANOTHER MICHIGAN MAKER.

ADRIAN, MICH., October 1.—The Page Woven Wire Fence Company, the pioneer in this branch of business which has revolutionized the manner of building fences in rural districts, is preparing to enter the manufacture of automobiles. It was the original intention of the company to locate in Detroit, but it was finally decided to take the unused factory building of the Church Manufacturing Company, where it is now installing machinery for the manufacture of automobiles. For the present the company will devote its attentions to the manufacture of a light runabout, but later on it will take up the manufacture of touring cars, and probably commercial trucks.

NEW AGENCIES ESTABLISHED.

A new Allegheny, Pa., concern is the Iron City Automobile Company organized by J. J. Seelar, John Weaver and P. S. Chambers.

The Willard Storage Battery Company, of Cleveland, O., has appointed the Crown Motor Car Company, of the Motor Mart, Boston, Mass., its New England representative.

Ralph Temple, of Chicago, has taken the agency for the Jackson cars, manufactured by the Jackson Automobile Company, of Jackson, Mich., having relinquished the Reo agency.

The Prentiss Motor Car & Supply Company, with temporary headquarters at 519 Colonial Building, Boston, has taken the local agency for the Studebaker line of cars, both gasoline and electric. The Prentiss company will soon establish itself in a new store in the Hub's automobile district.

The Motorcar Company, of Detroit, Mich., has placed its New York City representation in the hands of C. H. Galt, now of 253 Broadway, and he has secured the services of H. C. Billings as his associate. Mr. Billings was formerly identified with American Mercedes interests and the Daimler Manufacturing Company. An uptown location for the new Cartercar agency will be secured in the near future.

Recent additions to the membership roll of the American Motor Car Manufacturers' Association includes the Rapid Motor Vehicle Company, Pontiac, Mich.; American Motor Car Company, Indianapolis, Ind.; Dragon Automobile Company, Detroit, Mich.; Mora Motor Car Company, Rochester, N. Y.; and the American Machine Manufacturing Company, Detroit, Mich. The association now has 31 members.

PERSONAL TRADE MENTION.

Joseph Bennett has been appointed manager of the Boston branch of the Diamond Rubber Company, to succeed W. T. Helfer who leaves the Diamond people to accept a position with the Independent Tire and Rubber Company, of Kokomo, Ind.

On September 22 Thomas Midgley, president of the Midgley Manufacturing Company, Columbus, O., tendered his resignation, to go into effect at once. Since March, 1905, Mr. Midgley has been connected with the Hartford Rubber Works Company, and was recently elected president of that company, on the resignation of Mr. Dale. The only reason given for Mr. Midgley's action was that his entire time was taken up with his duties at Hartford. He leaves the Midgley company with his affairs in such shape that they can be easily handled by his successor, who has not yet been named.

TRADE PUBLICATIONS RECEIVED.

PHOENIX AUTO SUPPLY COMPANY, ST. LOUIS, MO.—Complete catalogue of automobile requisites, including lamps, horns, tools, tires, ignition apparatus, etc.

G & J TIRE COMPANY, INDIANAPOLIS, IND.—Booklet giving much interesting information regarding the construction of the G & J tires, especially the oval-tread tire.

S. F. BOWSER & CO., INC., FORT WAYNE, IND.—Pamphlet on the storage and handling of gasoline, and giving brief descriptions of some of the Bowser appliances for this work.

THE GROWING GARAGE LIST.

Plans for a new garage and salesroom, to be 60x160 feet, have been completed by the H. O. Harrison Company, of Los Angeles, Cal.

The American Locomotive Automobile Company, builders of American Berliet cars, has leased the garage on the northeast corner of Broadway and Sitxy-second street, New York, for a term of years, at an aggregate rental of $1,000,000.

Electric automobiles exclusively are handled at the new garage opened at 115 State street, West, Savannah, Ga., by C. P. Reneau, late head mechanic of the Electric Automobile Company. The place is thoroughly equipped for the work, and already has a good business.

One of the most complete garages in the Chicago territory is that of the Lake Forest Automobile and Machine Company, at Lake Forest, Ill. The garage, which is located near the summer homes of a large number of wealthy Chicago people, is 150 feet long and 45 feet wide. The walls are of brick with steel girders, and the cement floor has a slope from the center that allows the washing of machines without running them on a washing rack. The building has a capacity of twenty of the largest machines, and more may be housed if crowded. Well equipped and capacious garages have been built at Oconomowoc and other summer places, and more are in course of construction. They are all of the better class.

AUTOMOBILE STAGE LINES.

An automobile stage line has been planned to run between San Antonio, Texas, and Cotulla. Capt. William George is president of a company organized to handle the enterprise.

Natchez, Miss., has an automobile stage line, a passenger car making four round trips daily to Washington, Miss., and two trips to Woodville, running on a regular time schedule.

RECENT INCORPORATIONS.

J. H. Brady Auto Company, of Detroit, Mich.; capital, $10,000.

Chicago Motor Car Company, Chicago, Ill. Capital increased from $25,000 to $50,000.

Central Automobile Company, Chicago, Ill. Capital increased from $2,500 to $5,000.

Charles M. Johnson Company, Chicago, Ill.; capital stock, $2,000. To manufacture engines and automobiles.

Garage Operating Company, New York; capital stock, $100,000. Incorporators, N. H. Mason, W. J. Brady and H. C. Tuxbury.

Bellingham Automobile Company, Bellingham, Wash.; capital, $3,000. Incorporators, A. M. Lane, Marie Land and W. H. Land.

Jacobson Motor Company, Jamestown, N. Y.; capital, $100,000. Incorporators, Charles Jacobson, O. F. Sellstram and Jacob Jacobson.

Elbridge Motor and Tool Company, Elbridge, N. Y.; capital, $25,000. Incorporators, R. B. Sweet, W. L. Robedee and C. E. Delong.

Oklahoma Automobile Company of Enid, Oklahoma; capital, $10,000. Incorporators, F. J. Gentry, L. J. McClelland and C. H. Dyer.

A. E. Morrison Company, Boston, Mass.; capital, $25,000; to deal in automobiles and motors. President and treasurer, A. E. Morrison.

Crescent Automobile and Machine Company, Fond du Lac, Wis.; capital, $10,000. Incorporators: F. S. Wiley, H. E. Smith and H. R. Potter.

Borbein Auto Company, St. Louis, Mo.; capital stock, $10,000. Incorporators, H. F. Borbein, W. L. Johnson, Charles Borbein and Sadie V. Johnson.

Pennsylvania Auto Metal Body Manufacturers' Company, Reading, Pa.; capital, $250,000. To manufacture and deal in metal bodies for automobiles.

The Auto Pump Company, New York; capital, $10,000; to manufacture automobile pumps. Incorporators: R. B. Waite, S. E. Spencer and L. Shulees.

Imperial Garage Company, Columbus, O.; capital, $10,000. Incorporators, Charles V. Campbell, Clarence E. Mehlhope, James R. Rohrer and Arthur Stein.

Metropolitan Motor Car Company, Cleveland, O.; capital, $10,000. Incorporators, Andrew Squire, H. J. Crawford, A. J. Sperry, F. P. Shellhorn and C. E. Saunders.

Stranahan-Eldridge Company, Boston, Mass.; capital, $50,000; to deal in automobiles and motors. President, W. E. Eldridge; treasurer, F. D. Stranahan.

Lipman Manufacturing Company, Beloit, Wis.; capital stock, $60,000. To manufacture automobiles. Incorporators, Carl E. L. Lipman, L. Holden Parker and E. Lipman.

Washington Heights Garage, New York; capital, $10,000. To carry on a garage business. Incorporators, Dorman L. Ormsby, Joseph A. Adler and Thomas J. Meehan.

The Punctureproof Tire Company, Cleveland, O.; capital, $100,000. Incorporators, Frank Gentsch, G. Knodler, Frank Calvert, Edgar A. Anderson and C. E. Saunders.

Model Automobile Company, Peru, Ind.; capital stock, $50,000; to manufacture and sell automobiles. Incorporators: Milton Krauss, A. I. Bodudtha and W. S. Mercer.

The Crawford-Bradley Company, New York; capital, $45,000. To conduct a livery and garage business. Incorporators, William Crawford, Frank Bradley and H. J. Crawford.

Ben Hur Motor Company, Chicago, Ill.; capital, $50,000; to manufacture and deal in automobiles and motor boats. Incorporators: J. Herbert Hopp, Albert A. Barrett and C. Glenn Moats.

Rock City Auto Company, of Nashville, Tenn.; capital, $10,000. To repair and deal in automobiles. Incorporators, J. J. Hill, C. B. Wood, C. C. Hill, P. D. Houston and E. T. Thurmond.

Schlosser Manufacturing Company, New York; capital, $10,000; to manufacture and deal in automobiles, motors and motor boats. Incorporators: C. Schlosser, P. Schlosser and J. Bach.

Sangamon Auto Garage Company, Springfield, Ill.; capital, $6,000. To manufacture, repair and deal in automobiles. Incorporators, W. B. Chittenden, W. K. Zewadaki and E. E. Barclay.

New Jersey Auto Car Company, Newark, N. J.; capital stock, $100,000. General automobile dealing, storage and repairing. Incorporators, B. S. March, L. L. Popper and E. L. Popper.

Sears-Nattinger Company, Des Moines, Ia.; capital stock, $10,000; to manufacture and deal in automobiles, motors, parts and sundries. Incorporators: W. W. Sears and O. R. Nattinger.

Keystone Automobile and Garage Company; capital, $20,000. To manufacture and sell automobiles and machinery. Incorporators, Holmes N. Narwood, Harry E. Gates, William W. Lansing.

Ogden Automobile Company, of Ogden, Utah; capital, $15,000; to deal in, repair and store automobiles and bicycles. Incorporators: Albert Scowcroft, John S. Corley, Oscar B. Madson, William Van Allen, E. N. Musselman, G. W. McCune and Ralph Grange.

INFORMATION FOR BUYERS.

DOUBLE SCREW JACK.—A good jack comes very close to being an absolute necessity in the toolbox of an automobile, and if the jack is of reasonable size and weight and entirely reliable in its operation much time and trouble, and possibly a good deal of impolite language, may be saved. The

COVERT DOUBLE SCREW JACK.

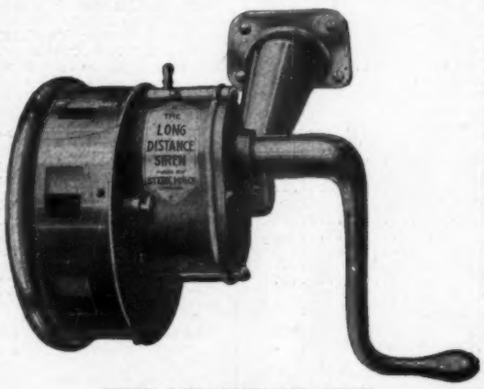
Covert Manufacturing Company, of Troy, N. Y., manufactures a double screw automobile jack with a ratchet operative device, which is said to be strong, light, easy to operate, compact and quickly adjusted. The accompanying illustration gives an excellent idea of the outward appearance of the Covert automobile jack.

DIRECTING THE CHAUFFEUR.—The passenger in an enclosed automobile is at a great disadvantage and may be seriously inconvenienced if there is no way of communicating with the chauffeur except by craning out of the window to give running directions; and even a speaking tube has its disadvantages. The height of convenience, not to say luxury, is attained in the electrically-operated annunciators that are now frequently fitted to closed cars. The accompanying illustration shows a set of the "Madison Square" instruments manufactured by C. Cowles & Co., of New Haven, Conn. There are two instruments in a set; one is placed in the passenger compartment and consists of a plate with eight push-buttons marked "Faster," "Slower," "Home," "Stop right," "Stop left,' "Turn round," "Left" and "Right." Attached to the dashboard, under the eye of the chauffeur, is a round brass case with a glass front, and on

COWLES ELECTRIC ANNUNCIATOR.

the glass are engraved the same words as appear on the push-button plate. When the passenger desires to give directions to the chauffeur, he pushes the appropriate button and the corresponding words on the glass are illuminated by a small electric light. Thus the passenger can express himself by merely reaching out his hand and pressing a little button. By means of this device the car can be perfectly directed from within. Another style is made, in which the chauffeur's indicator is rectangular instead of round. This style is called the "Mechanics' Hall" annunciator. In either case the energy for operating the instrument is obtained from three dry cells. The inside push-button plate is covered with morocco leather. The same concern manufactures an improved electric megaphone speaking tube which avoids the use of the bulb and can be operated by two dry cells. Other specialties are electric cigar lighters, dome lamps, reading lamps, push-button switches, robe rails, and so on in great variety.

LONG DISTANCE SIREN.—Though it is not by any means necessary for the automobilist to keep his signal tooting constantly, it is, nevertheless, very necessary that the car should be equipped with some sort of sound-producing apparatus to warn careless users of the road. A new device for this purpose has been brought out by the Sterk Manufacturing Company, of 73 Wells street, Chicago, Ill., under the name of the Long Distance Siren. This is constructed on the same principle as the well-known rotating siren, and is arranged to be attached to the dashboard of the car with the crank for operating it within convenient reach of the driver. The manufacturers state that the sound produced by this siren has very great carrying power, even against the wind, and when the crank is given one or two complete turns the sound will carry



STERK LONG-DISTANCE SIREN.

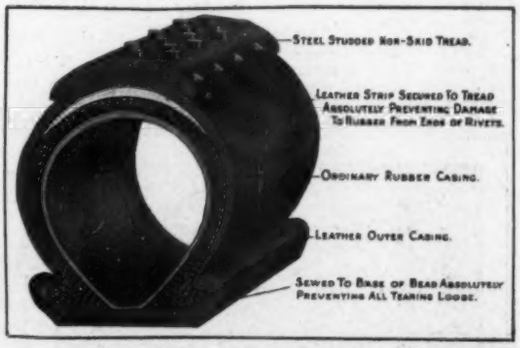
for miles. The whole apparatus is made of the best material. The siren wheel is a hollow disk of an aluminum alloy. In the casing is enclosed a train of gears for speeding up the disk to the necessary rapid rotation, and these gears are all cut from bar steel and run on ball bearings packed with grease; no attention or lubrication is required except at very long intervals—once a season, perhaps. The automobilist may not very often need to make such a sound as the siren will produce at full speed, but when he does need it, he is apt to need it badly, and with this he has all he can desire.

UP-TO-DATE ADVERTISING.—It is a well-known fact that in these piping times of ours advertising has been brought to a high state of perfection, and that nothing is too good for advertising work. But it is not often that an advertisement embodies such work as is to be found in a handsome booklet issued by the Packard Motor Car Company, of Detroit, Mich., under the title "The Flight of Thirty," describing a test run of a new 30-horsepower Packard car of the 1907 model from Detroit to Chicago and return in 20 hours 35 minutes. The story is told with a dash and vigor that takes the reader along the road with the car, jolts him over the rough Western pikes, makes his hair stand on end at the skidding turns and brings him back to Detroit feeling utterly exhausted from the strenuous ride—until he wakes up and finds he lost himself in the absorbing yarn. It is more than worth reading.

NEW PUNCTUREPROOF TIRE.—There is a world of comfort in the positive knowledge that when you start out in the car in the morning you will get home again without any suspicion of trouble, so far as the tires are concerned, and that even if the tires are pierced by nails or the like it will make no difference whatever. This was the opinion of the Punctureproof Tire Company, of 707 American Trust Building, Cleveland, O., in bringing out a tire that is claimed to be as easy riding as a pneumatic, while free from the possibilities of the trouble inherent in the ordinary pneumatic tire. The Punctureproof tire has extremely heavy walls of the best grade of rubber, enclosing a small chamber which, however, has no inner tube and no air under pressure. A cross section of the tire shows that the rubber does not form a continuous ring, but is split from the air-chamber to the rim through the base. These tires are applied to ordinary clincher rims by special machines of a well-known type, which compress the rubber and allow it to expand into the clincher rims.

AUTOMOBILE SUNDRIES.—The Wiley Auto Supply Company, of Hartford, Conn., which was formerly the Wm. H. Wiley & Son Company, manufactures a complete line of fabric supplies for automobiles, such as tire cases, lamp covers, car covers, tool rolls, engine boots, knuckle boots, hamper covers, dust shields and so on. Illustrated circulars are issued describing these goods.

NEW TIRE TREAD.—The automobilist whose pockets are not overflowing with cash, to say nothing of his wealthy brother, always feels a pang of regret when he sees a tire worn down almost to the limit and finds it necessary to figure on the cost of another. For this man the American Tire Company, of Owosso, Mich., has brought out a leather tread which can be applied to old tires and makes them, the manufacturers declare, as good as new. These treads, which are called "Xtra Servis" treads, are


STEEL STUDDED NON-SKID TREAD.
LEATHER STRIP SECURED TO TREAD ABSOLUTELY PREVENTING DAMAGE TO RUBBER FROM ENDS OF RIVETS.
ORDINARY RUBBER CASING.
LEATHER OUTER CASING.
SEWED TO BASE OF BEAD ABSOLUTELY PREVENTING ALL TEARING LOOSE.

AMERICAN TIRE COMPANY'S LEATHER TREAD.

made of leather with steel-studded tread; the edges are sewed to the under side of the tire, below the clinches or beads, and are securely held in place. The device is said to be puncture-proof and to resist chafing when running in ruts, while the steel studs prevent the skidding of the wheels on slippery road surfaces.

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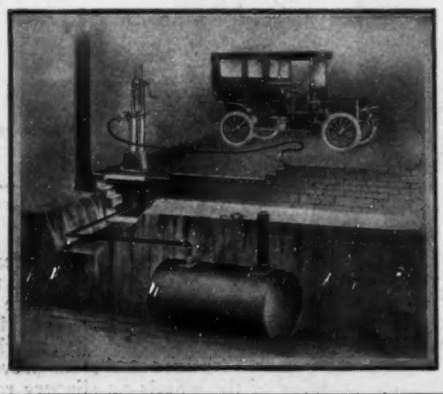

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